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8th Year of Publication

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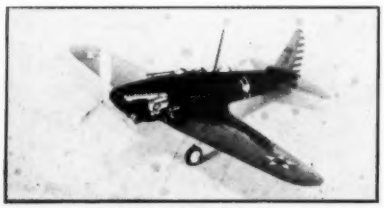

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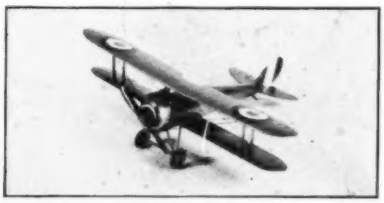

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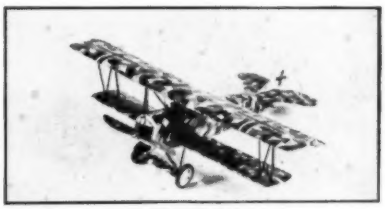
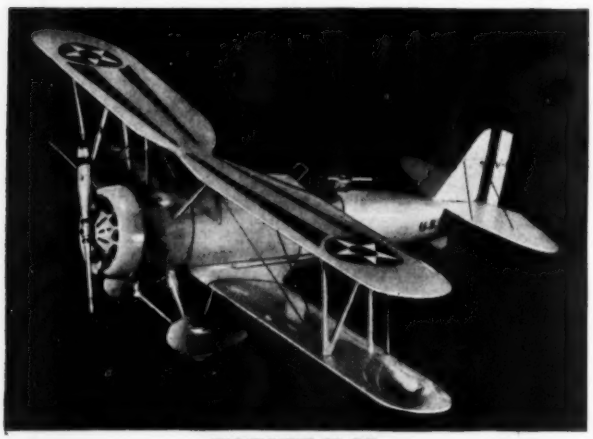


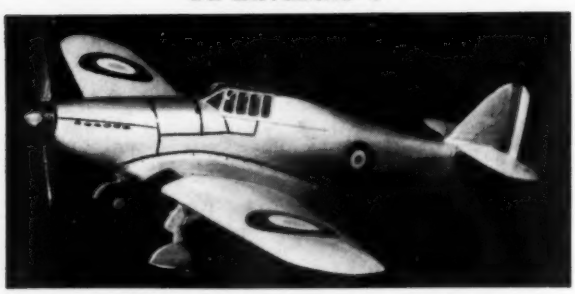
FOKKER D 7



VOUGHT V-65

BOEING F4B-4 (re-designed)

DE HAVILAND 4



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8th YEAR OF PUBLICATION

VOL. XV *No. 1*

Edited by Charles Hampson Grant

CONTENTS

AUGUST, 1936

U. S. Navy Fighters—Past and Present
By Gordon S. Williams 4

How to Build a Trophy Winner
By Kenneth Ernst 6

The Thomas Morse, O-19E (3 view)
By Willis Nye 8

Navi-Goid (Contest No. 2)
By Edward L. Semler 9

Build and Fly This Italian Fighter
By William Winter 10

Frontiers of Aviation
Including: How to Build a Scale Fairey "Battle"
By Robert C. Morrison 16

Shaping Your Model for Efficiency
By Charles Hampson Grant 19

"Gas Lines" (I.G.M.A.A. News) 20

The Buhl "Bull Pup" Gas Model (Plans)
By William Effinger 22

Air Ways—Here and There 26

Official Model Airplane Records 28

Ways and Means of Gas Model Success
By Joseph Kovel 29

The Junkers Fighter (3 view)
By Willis Nye 29

Aviation Advisory Board 30

In Our Next Issue

The Clippers Head South, by Robert McLarren gives intimate details of the development of the trans-pacific air route and of the Clipper planes that made this great advance in air transportation possible.

We have something very unusual for you in **Building the Flying Wing** by Gordon Englehart. Plans and instructions will be given to build one of the best performing scale models you have ever built. This "job" has been thoroughly flight tested.

How to Build the Wakefield Mayfly II, by C. S. Rushbrooke (drawings F. Zaic) gives you instructions and extremely detailed plans to create a fine English contest model.

A biplane of fine performance that any beginner can build is given in **Build and Fly This Simple Biplane,** by Raleigh T. Daniel.

Designing Your Fuselage Model, by Charles H. Grant, gives you the underlying principles that govern fuselage model design and shows you how to design a high wing or low wing ship of this type.

Joe Kovel tells you more about gas jobs.

Robert C. Morrison tells what is happening on the **Frontiers of Aviation.**

"Gas Lines," Air Ways, Aviation Advisory Board and **3 View Drawings** complete one of the finest issues of MODEL AIRPLANE NEWS ever published.

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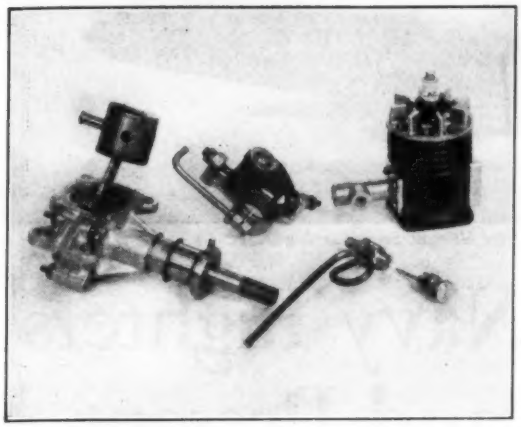

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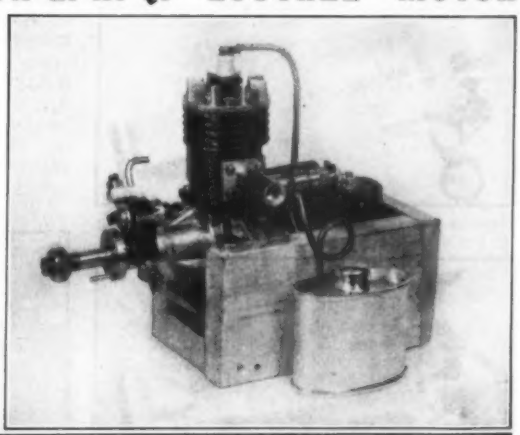

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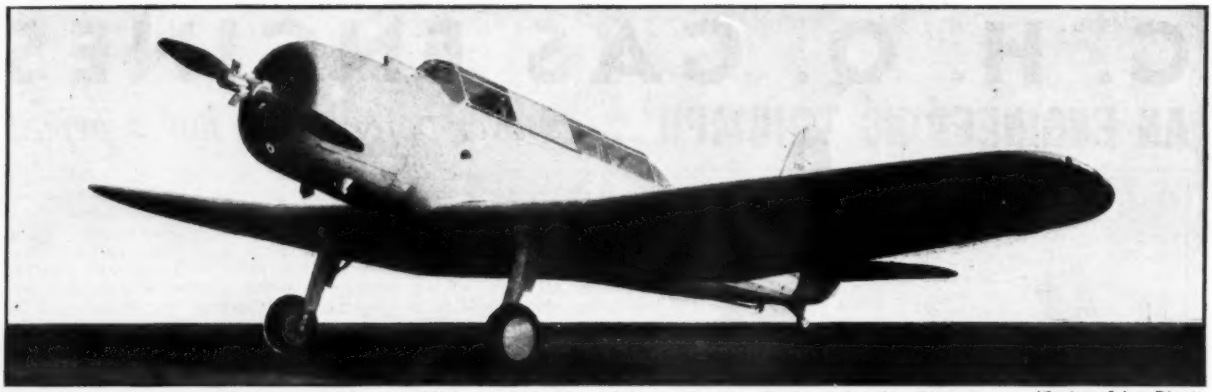


The latest and fastest addition to U.S. Navy fighters, the Vought Scout bomber XSB2U-1 (Courtesy of Aero Digest)

U. S. Navy Fighters Past and Present

Intimate Glimpses of Planes That Have Served to Create One of the Most Efficient Air Units in the World

By GORDON S. WILLIAMS

The B/J Fighter XFJ-2 (Wasp 500 hp. engine). Built for use in dirigibles (U.S. Navy Photo)

The last B/J Fighter FF3J-1 powered with a 700 hp. Wright engine

Here is the first air-cooled fighter, the Boeing FB-4 (Boeing Photo)

The Boeing F2B-1 fighter (Boeing Photo)

The Boeing XF5B-1 fighter flying the speed course at Anacostia (U.S. Navy Photo)

THE fighting airplane of our Navy represents the maximum in performance, maneuverability and gunnery. These ships are by necessity small high-powered machines, capable of striking the enemy and dodging quickly. The primary object of the fighter is to attack enemy aircraft with rapid gunfire, either offensively to gain mastery of the air, or defensively to protect our own aircraft, surface vessels, or shore stations. The secondary mission of the fighter is to attack enemy personnel on shipboard or ashore with machine gun fire and light bombs. This type ship, the Navy fighter, is designated as class "VF" meaning actually "heavier-than-air, fighter." Still another type has but recently been developed, the bombing-fighter. This type must combine fighting ability with the great strength necessary to withstand vertical power dives of many thousands of feet. In diving straight at their targets in a fast surprise attack from high altitudes, these ships have scored remarkable hits in battle practice.

The great majority of U. S. Navy fighters are of the single-seater type, carrying only the pilot who operates both the fixed guns firing forward and bomb toggles. Recently a new type has come in to popular use aboard the carriers, the two-seater. This type carries not only a pilot who handles forward fixed guns but also a rear gunner-radio-man who protects the tail from enemy attack.

Various types of Nieuports, Hanriots, and others of early vintage were used in the early 1920s as Navy fighters, but not until the advent of the aircraft carrier in 1922, when the revamped U.S.S. Langley was launched, did Navy fighters actually begin to come into their own. Although catapult fighters are not now in active use, all ships of this type being observation two-seaters, the Vought FUs were for a time used aboard both battleships and cruisers.

In the following paragraphs, a description as well as pertinent data will be given on all types of Navy fighters of the past and present. It will be seen by comparing figures on

The famous F4B-4 Boeing fighter

The XFH-1. The only fighter built by the Hall Aluminum Co. (Off. U.S. Navy Photo)

The little known Fokker XFA-1 fighter (Off. U.S. Navy Photo)

The high performance Grumman fighter F2F-1

the early types with those on the latest fighters that Naval aviation has taken great strides in but the last few years.

The Berliner-Joyce Aircraft Corporation of Baltimore, Md., entered the fighter competition with a small biplane known as the XFJ-1. This ship featured a new type of "under suspended" lower wing in which the panel was actually below the belly of the ship instead of being fastened directly onto the lower longerons. A lower landing speed and better visibility were said to be the main attributes of this type construction. A bad crash during a test hop necessitated extensive repairs after which the ship reappeared designated as XFJ-2. Various details were changed on this last model. Among these were air wheel landing gear, larger vertical tail and higher horsepower engine. Top speed with a 500 horsepower Wasp engine was approximately 190 miles per hour at 6,000 feet and climb was close to 2,000 feet per minute. Span was 28 ft. 10½ inches, length 20 feet. The B/J Corporation produced as an experimental Navy contract the XF2J-1 two-seater biplane of all metal construction and having a "gulled" type upper wing. A Wright R-1510 engine of 650 horsepower powered this job. It proved inferior in most respects to other two-seaters however and the design was dropped. A third ship of the VF class was made by B/J in 1934 as another try at Naval contracts, but this as had the others failed to get an order for them. This job, the XF3J-1, was an all-metal biplane with a monocoque fuselage and fabric-covered wings and controls, and used a Twin Whirlwind engine of 700 horsepower. The most interesting feature of this ship was the design of the wings which were of a double taper form, tapering not only at the tips but also at the roots, and aptly nicknamed "Butterfly Wings."

The Boeing Aircraft Company has perhaps gained more fame than any other manufacturer as a builder of fine fighting planes. The first of this long line of single-seaters appeared in 1925 and was known as the FB-1. A small biplane with tapered wings and a 435 horsepower D-12 engine, it was in the main merely a modified Army PW-9 type. Construction was of usual Boeing wood and tubing type. Wings being wholly of wood while the fuselage was of welded tubing, the whole ship being fabric-covered. The same basic design was used throughout all the FB types, others differing only in engine installation, improvements in internal construction, etc. The FB-2 had deck landing equipment for the first time. The FB-3 mounted a Packard 1A-1500 engine of 500-600 horsepower and had balanced controls as well. A Pratt and Whitney Wasp R-1340 engine of 400 horsepower, later to be used exclusively in Boeing fighters, was for the first time used in the FB-6. This job was a further development of the FB-4 powered with an air-cooled Wright radial "P" engine of 450-500 horsepower and the FB-5 with a Packard 600.

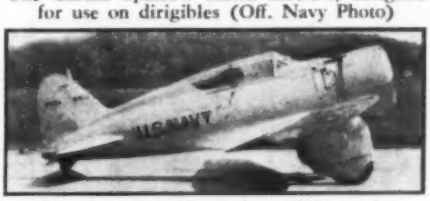
The XF2B-1 was produced late in 1926 as an improved FB type again. A 450 Wasp gave it a top speed of 154 miles per hour and a ceiling of 22,000 feet. Ships of this type were used by the famous "Three Sea Hawks" stunt team, composed of Lts. Tomlinson, Storrs and Davis. In 1927 a slightly larger fighter appeared, known as the F3B-1. It boasted sweptback upper wings and straight lower panels and corrugated dural controls. The F4B-1, the next type developed, became a famous ship almost overnight as it broke many of the existing records for service ships at the time. Top speed was 180 miles per hour and ceiling was over 27,000 feet. A refined version, F4B-2, also appeared having a ring-cowled 500 Wasp engine, axle landing gear and other new features.

(Continued on page 40)

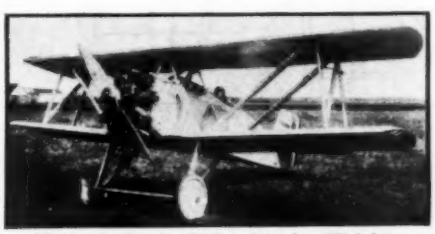
The famous Curtiss Sea Hawk XF7C-1. Note the sweptback wings (Off. Navy Photo)

The first Curtiss Helldiver XF8C-2 fighter. It was powered with a "Wasp"

The Curtiss Sparrow Hawk XF9C-1, designed for use on dirigibles (Off. Navy Photo)

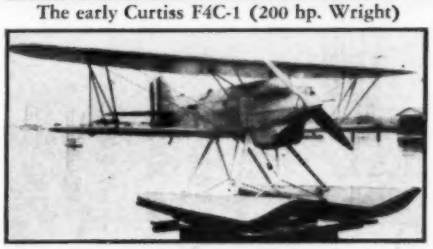


One of the U.S. Navy's latest fighters, the Northrop XFT-1 (Off. U.S. Navy Photo)



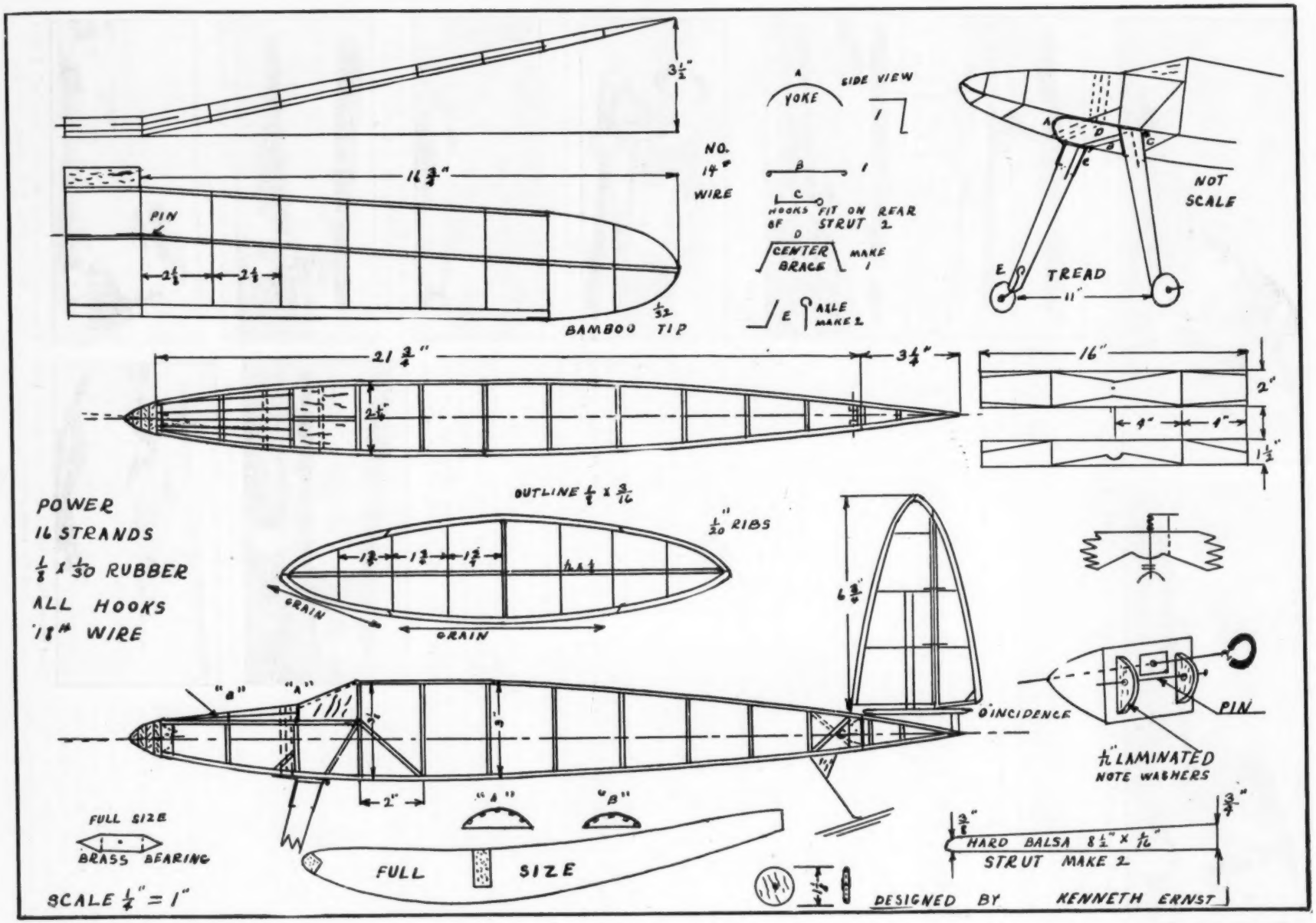
The early Curtiss F4C-1 (200 hp. Wright)

Vought's first fighter, the FU-1 (Off. U.S. Navy Photo)



The Curtiss Hawk F6C-2 with twin floats. One of the early models

The record-breaking Wright "Apache" F3W-1 fighter (Off. U.S. Navy Photo)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4"
1½"
OUTLINE ¼ X 3/16
1/20" RIBS
GRAIN
GRAIN
POWER
16 STRANDS
⅛ X 1/30 RUBBER
ALL HOOKS
18" WIRE
6¾"
"B" "A"
2"
"A" "B"
FULL SIZE
BRASS BEARING
FULL SIZE
SCALE ¼" = 1"
0° INCIDENCE
PIN
1/16" LAMINATED
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⅜"
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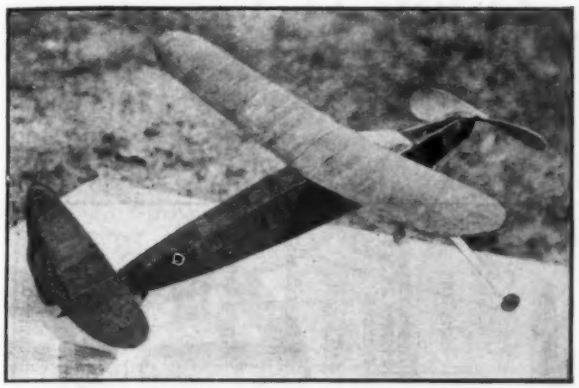
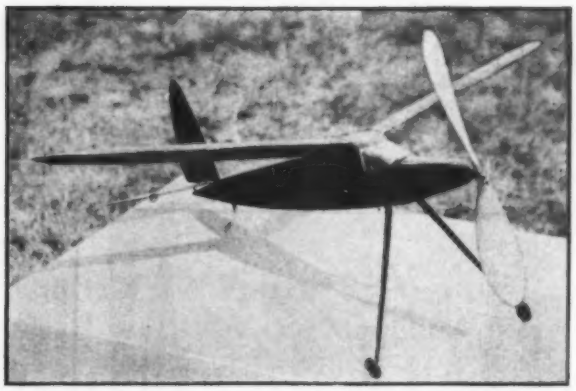
HARD BALSA 8½" X 1/16"
STRUT MAKE 2
DESIGNED BY KENNETH ERNST



The finished model shows true contest lines



The large propeller gives long duration and high climb

How to Build a Trophy Winner

This Plane Won the 1935 Stout Trophy. Here's How You Can Build and Fly It

By KENNETH ERNST

HERE she is, fellows, the winner of the Stout Outdoor for 1935. It has all the appearance of a real ship with the soaring quality of a Bowlus. This is proven by the fact that four of them have been lost from the sight of the timer by flights of 20:5 (Stout Trophy) 18 minutes, 15 minutes, and 9:10. This ship beside winning the coveted Stout Trophy, placed third in the Scripps-Howard cross-country derby in which one entrant was chosen from each city by an elimination contest. This ship represented Indianapolis.

If drawings are carefully followed it will prove its worth by placing you among the honored at any contest.

Fuselage

We will start with the fuselage as it is the main bulk of the ship. First enlarge the drawings four times by using a pair of dividers; that is taking the part to be measured and stepping it off four times. With the fuselage laid out, pin a piece of oil paper over the drawing to prevent the parts from sticking. Next pin the ⅛ square longerons in place, then glue in the ⅛ square upright braces. The fuselage and tail piece are built as one unit, and cut apart later so as to insure a perfect fit.

When the two sides are finished, assemble by adding in the cross braces, the cowling and the windshield. The cowl is made with bulkheads A and B. When in place, notch and fit in five evenly spaced, 1/16 stringers. These stringers must be of hard balsa as they have to stand the strain of the rubber shock absorber. The windshield is made in two pieces. A paper pattern should be made to find the exact fit. Now the tail plug. Be sure that you have put a double brace on top, bottom, and the two sides. Now cut the plug away with a sharp razor blade cutting the longerons between the double braces. Make a bulkhead from two pieces of 1/16 veneer and laminate. Glue this in the plug and trim to fit.

Next, the rear hook is bent to shape, of No. 18 wire, and glued in place to the bulkhead. Be sure the hook is in to stay as it must stand the strain of a fully wound motor. Make a hook behind the bulkhead so it will not pull through. Next laminate two pieces of 1/16 flat veneer to form lugs. These are glued to the rear bulkhead in the plug. Make a half circle and fit plug to fuselage. Run a straight pin through the fuselage and lugs and the tail will be held in place. For clearer explanation, refer to nose plug on drawing as the method is the same. This method allows the tail to be put on in a hurry, hence, not killing your motor. Nose plug is made of ⅛ cross-grained and is attached in a similar manner.

Landing Gear

The struts are made of tough 1/16 flat veneer. Sand to shape as shown in drawing. Lay this aside until you have made the wire parts. Before bending parts, study drawings to make sure you understand how it works. These parts are made of No. 14 wire. Carefully bend them to shape and glue to the struts. After they are completely dry, line up with a pair of pliers for correct tread. Wheels and axles are next added to the gear. It is now ready to hook to the fuselage. To the proper cross brace (indicated in the drawing) may be found a piece of wire running the whole length of the brace. It is lashed to the fuselage with thread and an eye is bent in each end. Into these eyes the hook on the rear of each strut is hooked. Glued to the front of each strut is a wire yolk that lays flush with the bottom of the fuselage. Slipped around this and the cowl are several rubber bands which act as shock absorbers.

To remove the landing gear, slide the rubber bands forward and landing gear will swing back and unhook. This landing gear will take shock from any angle without breaking and is light and quickly removable. To make it more rigid, add more rubber bands. The tail skid is made of No. 14 wire. One-sixteenth webbing is used to strengthen it. When fuselage is complete, carefully set it aside where it will not be broken.

We are now ready for the wing and tail.

The tail is the simplest so start it first. The construction of the rudder and elevator is identical except that the rudder is adjustable. The single spar is made of ⅛ x 1/16 hard balsa. The leading and trailing edges are made of 3/16 x ⅛ veneer. Note that these pieces are spliced due to the direction of the grain. See drawing for the exact places where these splices are to be made. Ribs are rectangles ⅛ x 1/32 glued in place and when dry are sanded to a streamlined section.

Start the wing by cutting out all the ribs of 1/32 or 1/20 veneer depending on the strength of the wood. The main spar is made of 5/16 x 1/16 hard balsa and should be free from any defects as there is nothing more sickening than to see your wing fold up. A broken wing is usually a mess to repair on the field. The leading edge is made of ⅛ square, the trailing edge of ⅛ x 3/16. Next make the wing tips of 1/16 square bamboo. First moisten and bend around a hot soldering iron. With all parts cut to size, pin the center spar, leading, and trailing edge on the drawing and glue in the ribs. This finished add wing tips and allow to dry. When everything is dry, smooth with sandpaper and then crack the spars for dihedral. Block up each tip 3½ inches. Notice that there is a slight sweep-back. This aids the stability.

Start covering with the wing, the grain of the paper running parallel with the ribs. This will not allow the paper to sink between the ribs and ruin the airfoil.

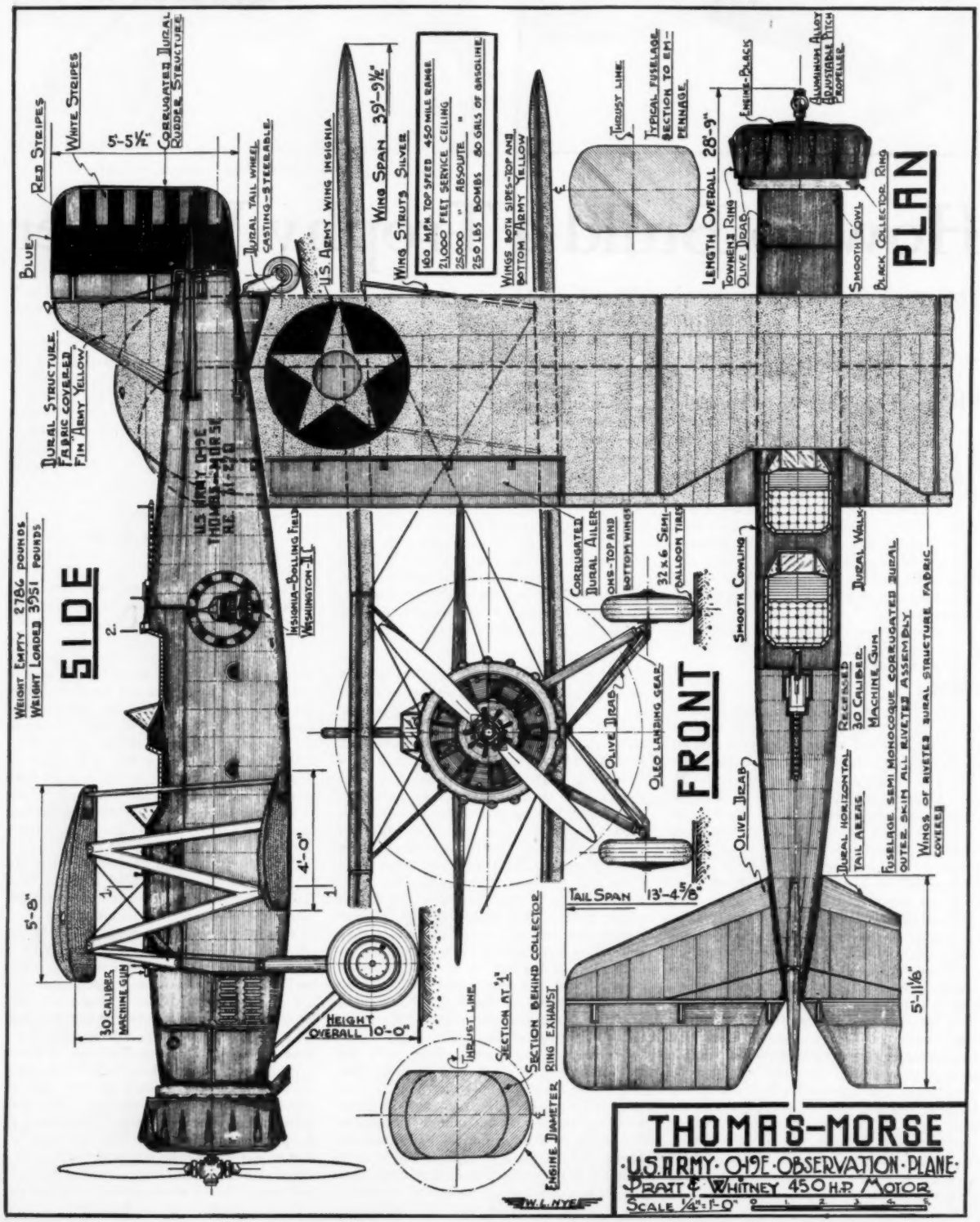
The fuselage and tail come next. When all is finished, trim off excess paper with a sharp razor. Spray all parts with water and allow to dry at room temperature. Do not try to hasten drying. When dry, the model can be pigment doped or banana oiled. The original model was all red, but from past experience I believe dark blue or black would be better on a bright day with some part of the model, such as the rudder, painted silver to reflect the sun. This will make a flash every so often and will help to keep your ship in sight. The last part of our model is the prop and power unit. The block size is shown on the drawing and will not need a lot of explanation. The cut out

(Continued on page 39)

The Thomas Morse O-19E (3 View)

THIS plane bears the name of an illustrious group of the civilian and army aircraft of the U.S.A., dating back from the Glenn Curtiss era. At the present time this company is owned by the Consolidated Aircraft Company of Buffalo.

This plane dates back to about 1927, when the U.S. Army seriously turned its eyes to the merits of all-metal construction. After several experimental models, the plane was formally accepted and about 270 of them were built. The plane was built up around both liquid-cooled and air-cooled engines. The liquid-cooled engine model was slightly modified but in general appearance was similar to the O-19E. It could maneuver as easily as the ordinary training biplane and yet was very fast.



Contest No. 2

By EDWARD L. SEMLER

Author's Note:

Since some of the contestants in contest No. 1 have had trouble finding all the necessary data and of assembling it orderly, we are giving this formula, which will illustrate the method of determining the correct answers to Navi-Goid No. 2.

This will give you an excellent advantage, since you merely have to fill in the readings designated by question marks and to plot the course on the map.

The formula following should clear up every vague point that might arise in your mind.

The fundamentals of procedure to be followed during this contest was fully explained in three articles printed in the February, March and April issues of this magazine. It will be necessary for the contestant to have these articles for guidance. If you are unable to locate these issues, write to Model Airplane News, 551 Fifth Avenue, New York City, enclosing seventy-five cents, and the copies will be forwarded to you at once.

The instruments you will need, are: A sharp pencil, an accurate pair of dividers and a protractor. (The protractor will give the degrees of the compass.)

Each Navi-Goid will be judged as an individual contest. The prizes, consisting of the choice of any $5 (or less) model plane advertised in this magazine going to the five correct or most nearly correct answers received: in case of tie, the entries to be judged on the Post Office Time Stamp. The decision of the judges will be final.

Get busy and complete what little there is left undone in the formula. These $5 kits are swell!

NAVI-GOID

The Big Contest for Future Navigators

Try This and Learn to Navigate Your Plane

Navi-goid No. 2 Formula

(The Factors in Parentheses Are to Be Determined)

3:46 P.M.

Groundspeed 130 m.p.h.
Altitude 7.0
Magnetic Course 235°
Drift 2° N
6° Easterly Variation

Hours Flown 3½
True Course 243°
Miles Flown 455

7:15 P.M.

Magnetic Course 233°
Altitude 6.0
Airspeed 150 m.p.h.
Windspeed 24 m.p.h. headwind
Variation 6° E

Hours Flown (?)
True Course (?)
Miles Flown (?)

10:30 P.M.

Headwind 4 m.p.h.
Airspeed 170 m.p.h.
Altitude 7.0
Magnetic Course 233°
Variation 6° E

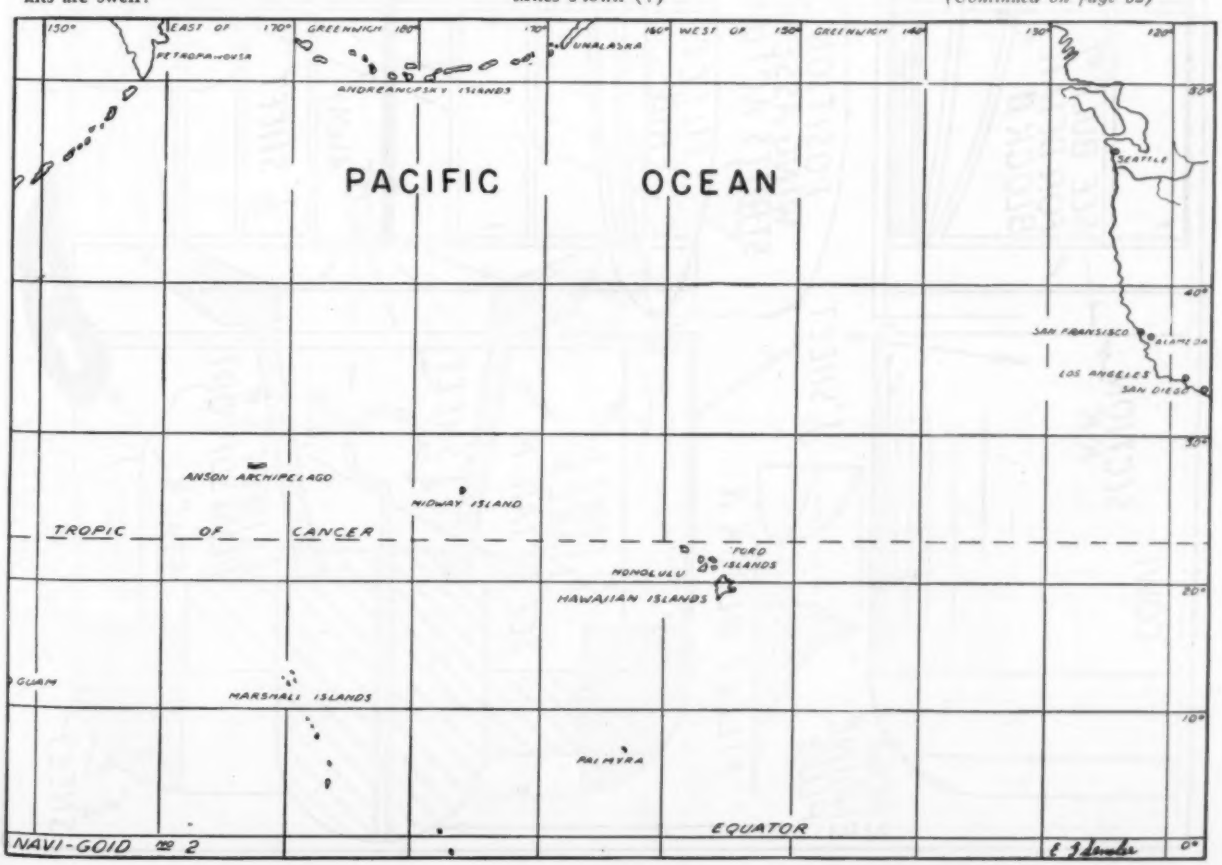
Hours Flown (?)
True Course (?)
Miles Flown (?)

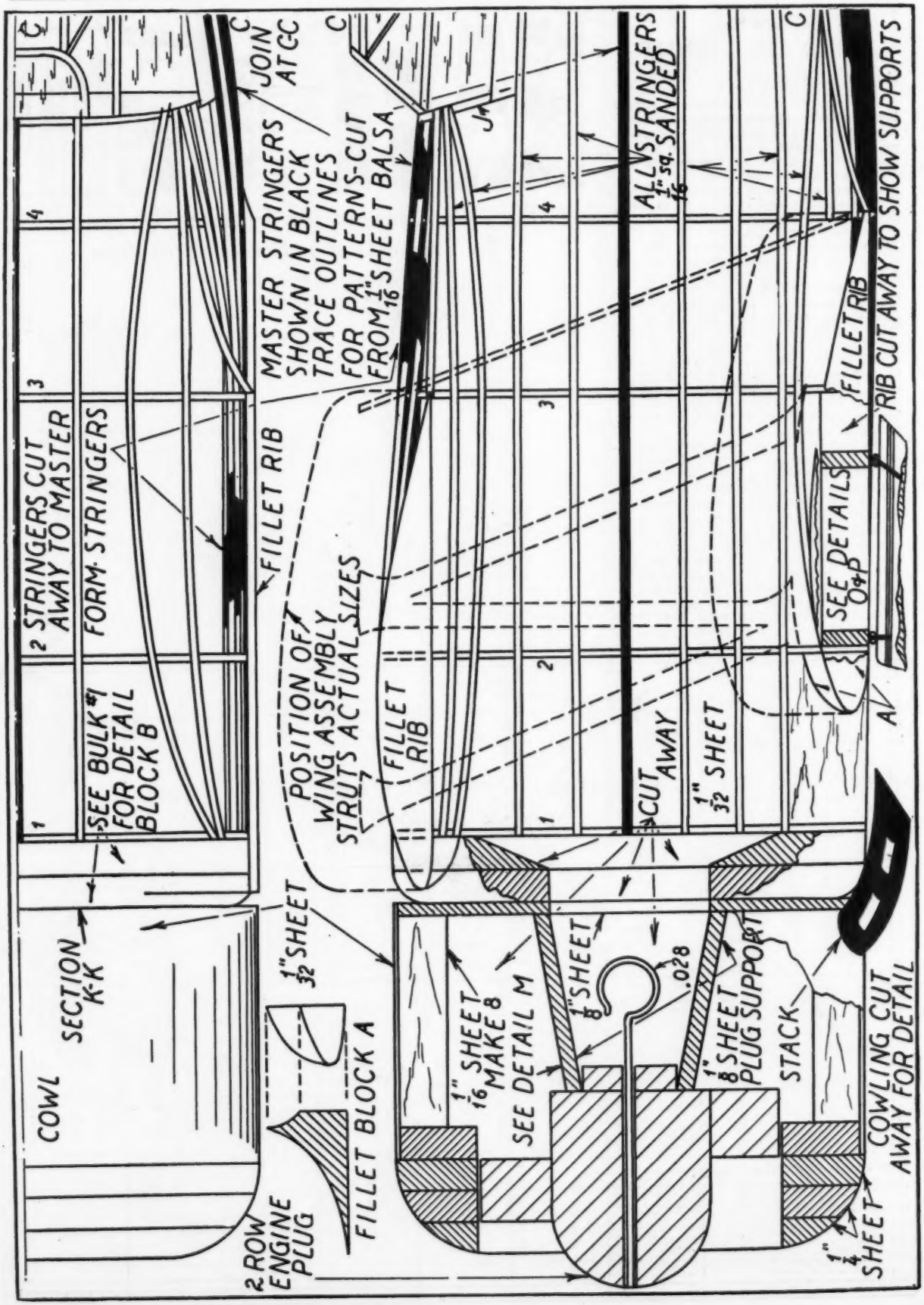
11:40 P.M.

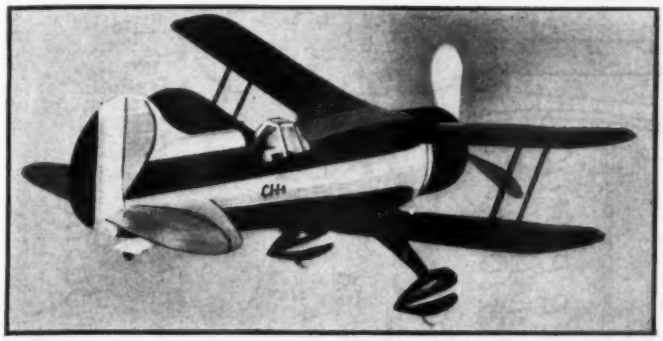
Altitude 7.5
Drift 8° S
Groundspeed 140 m.p.h.
Magnetic Course 234°
Variation 6° E

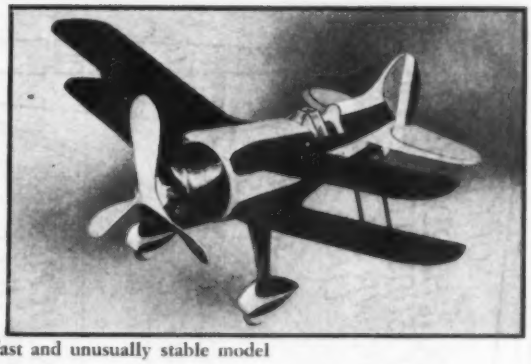
Hours Flown (?)
True Course (?)
Miles Flown (?)

(Continued on page 32)




COWL
SECTION K-K
2 STRINGERS CUT AWAY TO MASTER
FORM STRINGERS
SEE BULK #1 FOR DETAIL BLOCK B
JOIN AT C
MASTER STRINGERS SHOWN IN BLACK TRACE OUTLINES FOR PATTERNS-CUT FROM 1/16" SHEET BALSA
FILLET RIB
POSITION OF WING ASSEMBLY STRUTS ACTUAL SIZES
FILLET RIB
ALL STRINGERS 1/16" SQ. SANDED
CUT AWAY
1/32" SHEET
SEE DETAILS O & P
FILLET RIB
RIB CUT AWAY TO SHOW SUPPORTS
1/32" SHEET
FILLET BLOCK A
2 ROW ENGINE PLUG
1/16" SHEET MAKE 8 SEE DETAIL M
1/8" SHEET
.028
1/8" SHEET PLUG SUPPORT
STACK
COWLING CUT AWAY FOR DETAIL
1/4" SHEET





How the little ship looks when completed, a fast and unusually stable model

Build and Fly This Italian Fighter

How You Can Create a Flying Model of One of Italy's Speedy Pursuit Planes, The Caproni C.H.1

By WILLIAM WINTER

THE Caproni C.H.1, one of the world's finest fighters powered by the Gnome-Rhone 14 cylinder, double row, air-cooled radial engine is capable of speeds higher than 270 m.p.h. A biplane type, this Italian ship as its very appearance suggests, is adaptable to the most violent acrobatics.

Because of its sleek appearance and flying possibilities as well as all the latest features incorporated in its design, this ship affords an interesting model to build and fly.

Under actual flight conditions, the miniature C.H. 1 revealed an ability to fly fast with the utmost stability, an excellent glide, and because of the natural strength of the Caproni design the added attraction of coming though all mishaps with flying colors.

The construction method used involves the use of four master stringers all of which are cut to shape from 1/16" sheet balsa. This system combines to the best advantage all that is desired in ease, accuracy and time expended.

Fuselage

Trace the top, side and bottom outlines of the fuselage on stiff paper. Trim the paper thus marked to serve as patterns for the cutting of the master stringers. These master stringers are cut from a firm piece of 1/16" sheet. On each is marked the position of the bulkheads.

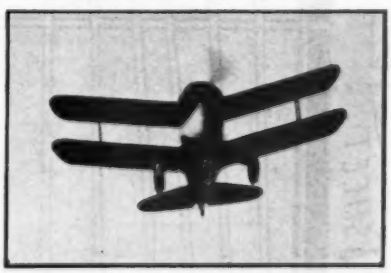
The bulkheads are cut from 1/16" sheet balsa. Cut only the notches for the master stringers marking for later use the positions of the auxiliary stringers. The bulkheads are assembled to the two side master stringers. When dry, the top and bottom master stringers are slid into place. The auxiliary stringers are all 1/16" sq. sanded slightly. As each is placed in position, cut the notches required as the work progresses. This procedure will permit the compensation for inaccuracies in your work. A sliver of a sharp two-edged blade makes easy the cutting of these notches. Note that number 9 bulkhead is two ply 1/16" sheet.

As the fillet ribs are required at this time it is advisable to cut all the wing ribs at once. The fillet ribs as well as the inner ribs of each of the four wing panels are 1/16" sheet, the remainder being cut from 1/32" sheet stock.

The fillet ribs are cemented to the extensions of the wing supporting bulkheads. Check the incidence carefully at this point.

The block that forms the nose and supports the cowl assembly is built up of two ¼" plys. The rear face of this block as designated Detail B on the bulkhead sheet, is shaped to fit Bulkhead No. 1. The front face of this block is round. In carving the excess wood, shape the top of the block to form the fillet for the top wing. The hole to be cut out is designated on the side view and in the Detail B. This block is also further detailed near the front view.

The cockpit side edges are formed from



In flight. It will be one of the best fliers you have ever built

1/32" sheet. The enclosure former is 1/16" sheet. Small pieces of wood form the framework of the enclosure. The headrest is a round piece of ⅛" sheet.

For the landing gear support, two pieces of ⅛"x⅜" are cut to fit between the second and third bulkhead as seen on the side view. These pieces are detailed on the plan as S. Two additional pieces R are also cut to size from ⅛"x⅜" as required and mounted crosswise to the first two, S. A sketch of the arrangement is labeled Detail O. At the joints the crosspieces are countersunk. Two pieces of 1/16" aluminum tubing are bound to the two transverse pieces as in the sketch. The .028 wire that is attached to each landing leg runs through these pieces of tubing as shown in detail P.

The lower portion of the fuselage between number 1 and 2 bulkheads is covered with 1/32" sheet. Shape fillet block A and glue to this sheet balsa so that the rear face of the block coincides with the extension of the bulkhead.

Bend the rear hook to shape from .028 wire and imbed in number 9 bulkhead as shown.

To cover use narrow strips of tissue to avoid wrinkles. Dope all frayed edges down. The completed covering is lightly sprayed and doped. The color scheme was portrayed by the cover of the July issue.

Tail Surfaces

As the tail surfaces are tapered in thickness, it is necessary to cut the spars for both stabilizer halves and the rudder from 1/32" sheet as given by the patterns. The edges are of 1/16" sq. bamboo although balsa may be substituted as shown by the broken lines. Note that the innermost pieces of all units are of 1/16" sheet. The rounded portion of the rudder is a block of soft balsa shaped to conform with the outlines of the number 9 bulkhead.

To cover use a separate piece of tissue for each side of stabilizer halves and the rudder.

Cement each tail section to the fuselage at the position shown by the plan. It may be necessary to use small pieces of bamboo to support the stabilizer halves.

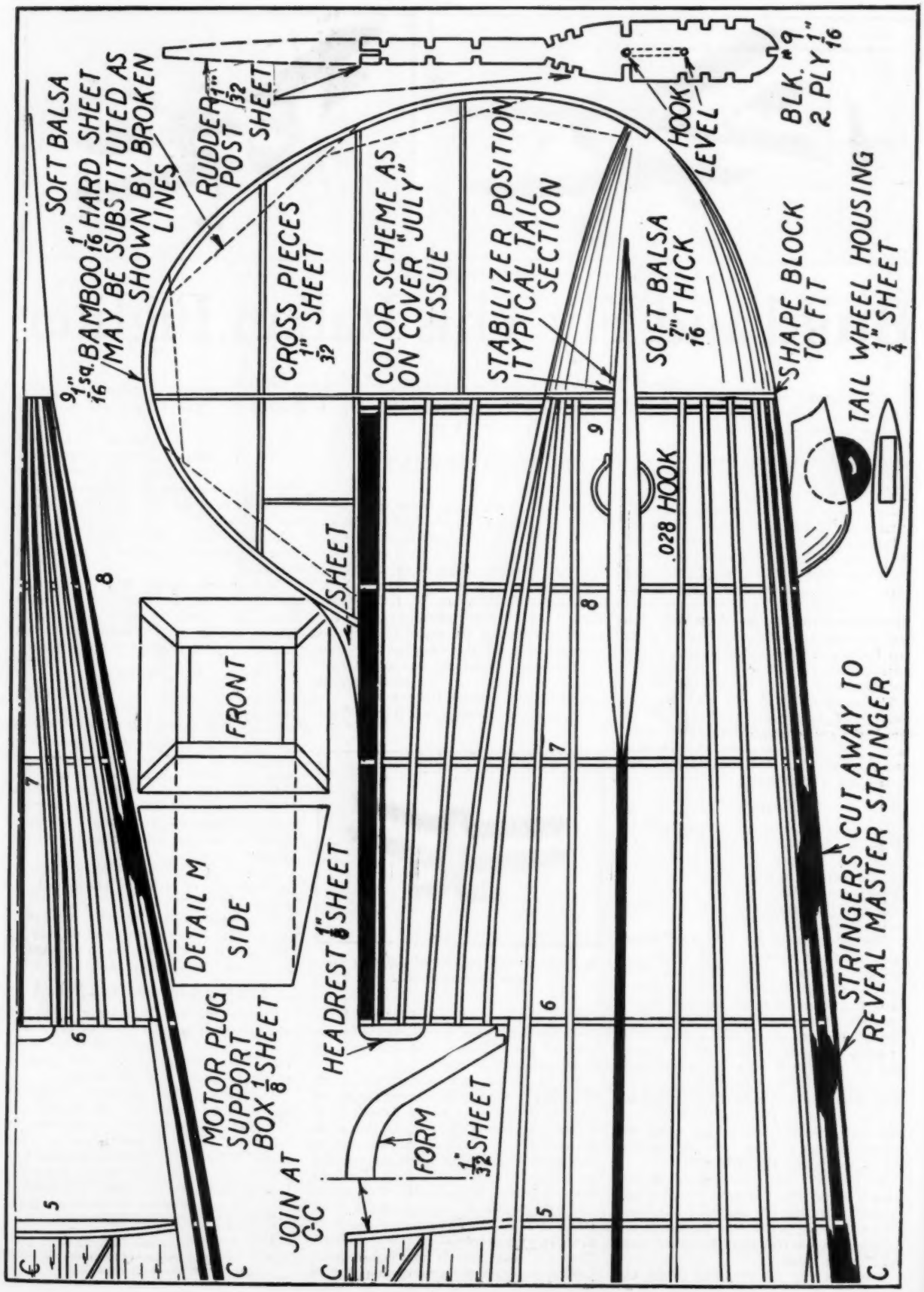
Landing Gear and Tail Wheel

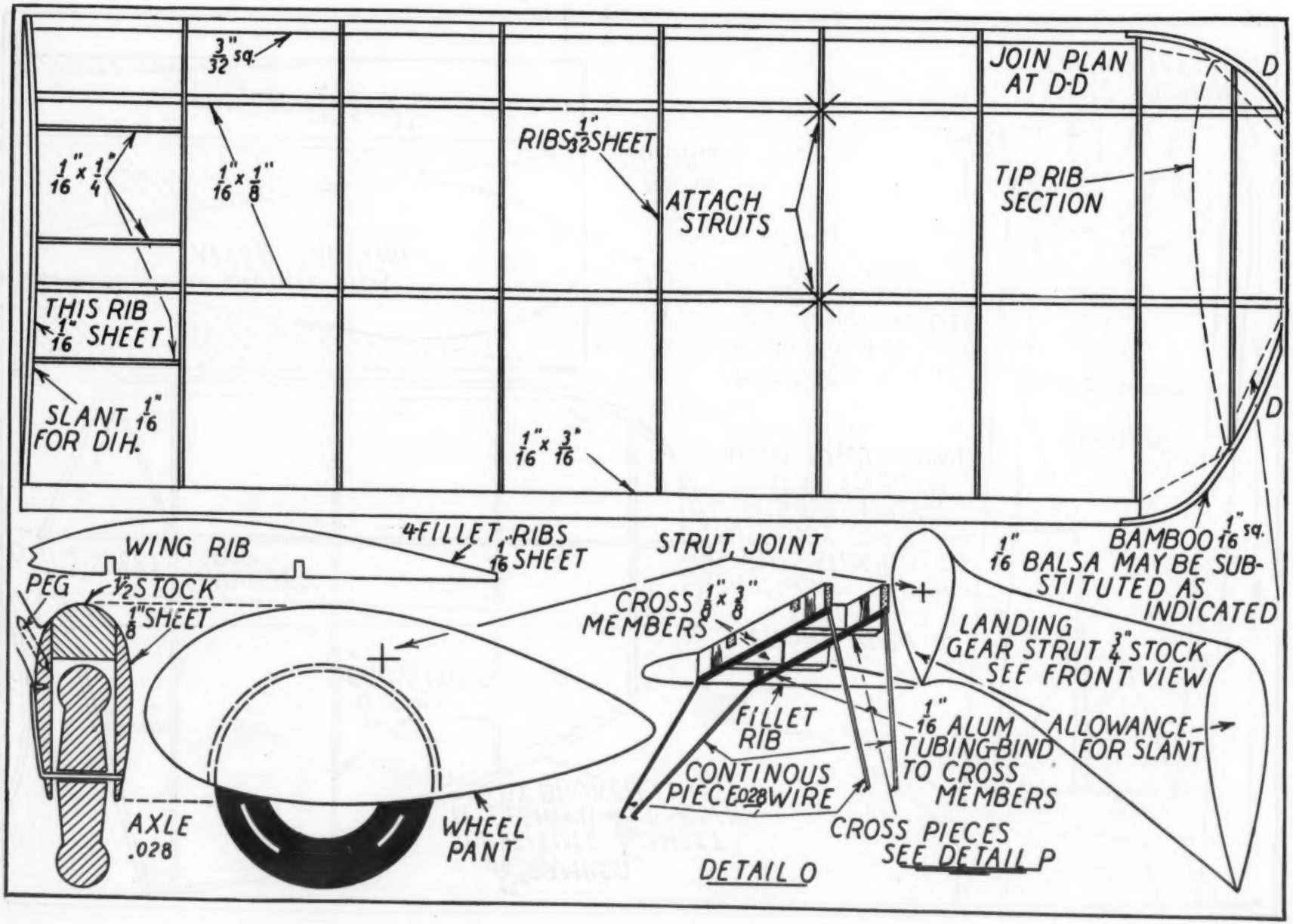
The landing gear legs are cut one left and one right from a piece of balsa ¾" thick. The ends are slanted as shown to fit the fuselage and the pants. Each piece is of course streamlined and sanded.

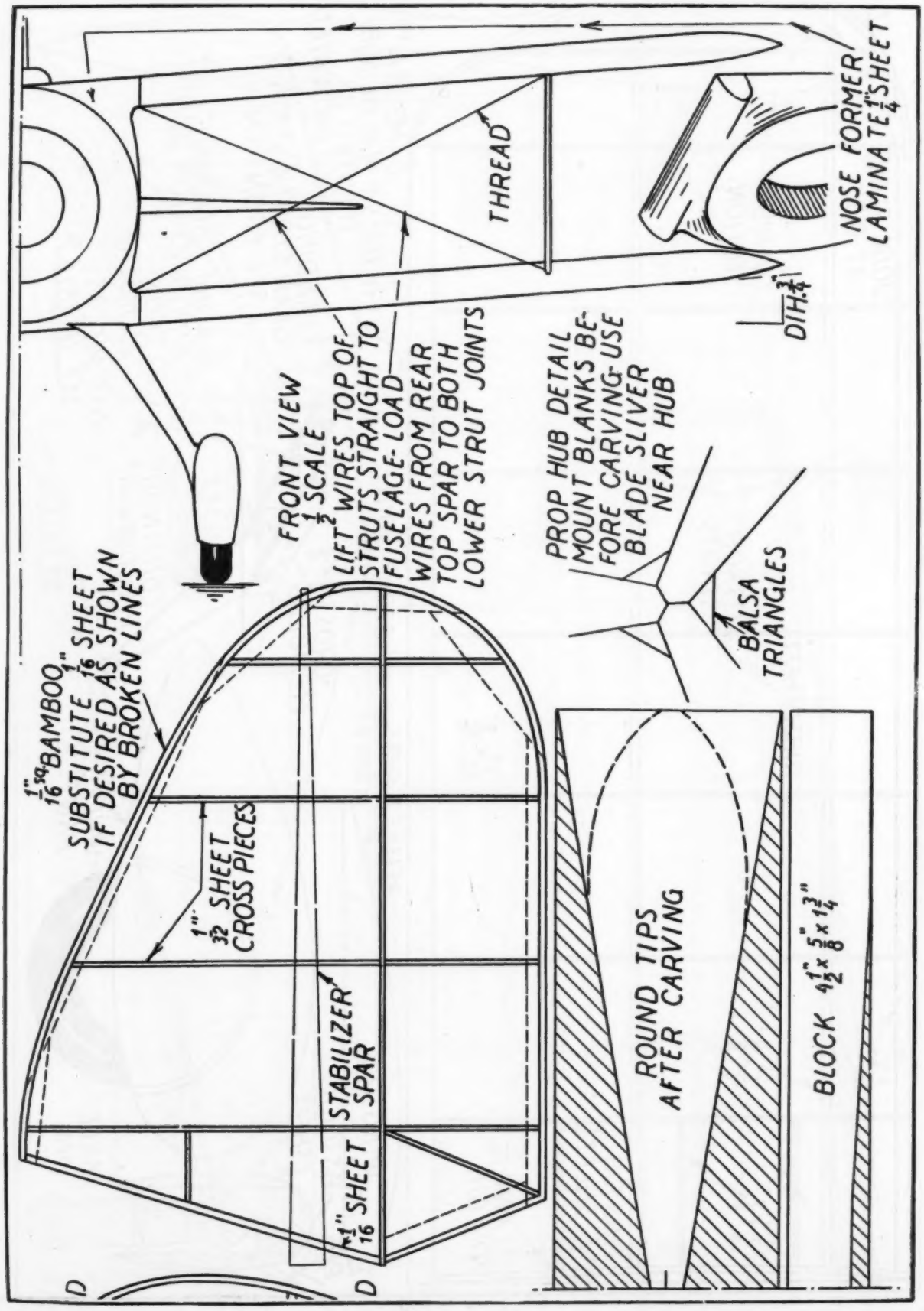
The pants are built up pieces. The outer pieces are cut to the side view shape from ⅛" sheet. The center piece similarly cut is ½" thick. The pants are shaped by razor to the desired streamline and sanded. The 1¼" wheels are mounted on .028 wire axles bent as shown by the detail. The finished pants are each attached to the proper landing leg by a bamboo peg and heavy cement.

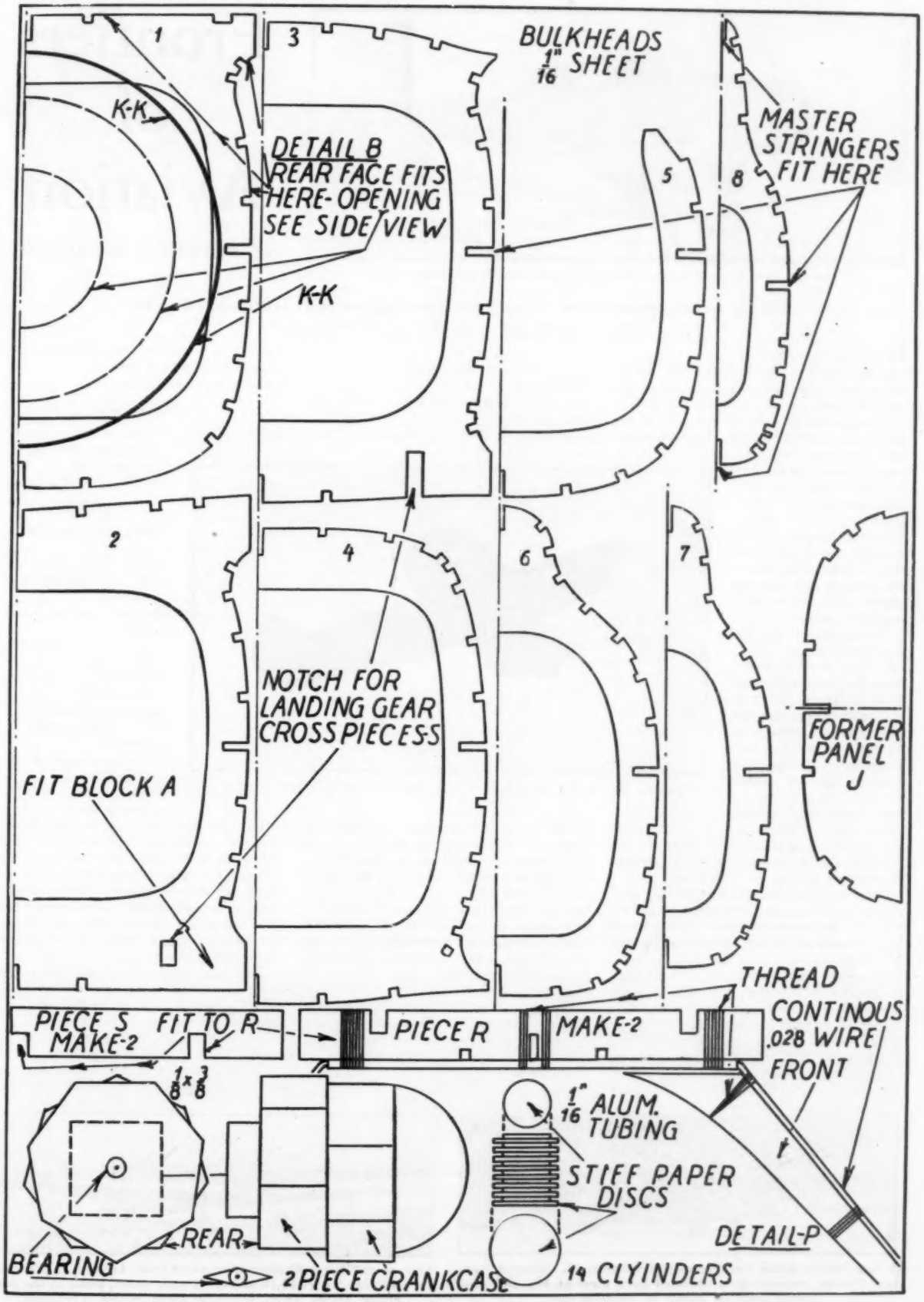
Pass a piece of .028 wire through each of the tubing lengths beneath the fuselage

(Continued on page 39)


SOFT BALSA
1/16" HARD SHEET
MAY BE SUBSTITUTED AS
SHOWN BY BROKEN
LINES
9/16 SQ. BAMBOO
RUDDER POST 1/32 SHEET
CROSS PIECES 1/32" SHEET
COLOR SCHEME AS ON COVER "JULY" ISSUE
STABILIZER POSITION ITYPICAL TAIL SECTION
HOOK LEVEL
BLK. "9" 2 PLY 1/16"
SOFT BALSA 1/16" THICK
SHAPE BLOCK TO FIT
TAIL WHEEL HOUSING 1/4" SHEET
.028 HOOK
SHEET
FRONT
DETAIL M
SIDE
HEADREST 1/8" SHEET
MOTOR PLUG SUPPORT BOX 1/8 SHEET
JOIN AT C-C
FORM
1/32 SHEET
STRINGERS CUT AWAY TO REVEAL MASTER STRINGER
C
C
C
5
6
7
8
9
11


3/32" sq.
JOIN PLAN AT D-D
D
1/16" x 1/4"
1/16" x 1/8"
RIBS 1/32" SHEET
ATTACH STRUTS
TIP RIB SECTION
THIS RIB 1/16" SHEET
SLANT 1/16" FOR DIH.
1/16" x 3/16"
D
WING RIB
4 FILLET RIBS 1/16" SHEET
STRUT JOINT
BAMBOO 1/16" sq.
1/16" BALSA MAY BE SUBSTITUTED AS INDICATED
PEG
1/2" STOCK
1/8" SHEET
CROSS MEMBERS 1/8" x 3/8"
LANDING GEAR STRUT 3/4" STOCK SEE FRONT VIEW
FILLET RIB
1/16" ALUM TUBING-BIND TO CROSS MEMBERS
ALLOWANCE FOR SLANT
CONTINOUS PIECE .028 WIRE
AXLE .028
WHEEL PANT
CROSS PIECES SEE DETAIL P
DETAIL O


NOSE FORMER LAMINATE 1/4" SHEET
THREAD
DIA. 3/4"
FRONT VIEW 1/2 SCALE
LIFT WIRES TOP OF STRUTS STRAIGHT TO FUSELAGE- LOAD WIRES FROM REAR TOP SPAR TO BOTH LOWER STRUT JOINTS
PROP HUB DETAIL MOUNT BLANKS BEFORE CARVING- USE BLADE SLIVER NEAR HUB
BALSA TRIANGLES
1/16" BAMBOO 1/16" SHEET SUBSTITUTE IF DESIRED AS SHOWN BY BROKEN LINES
1/32" SHEET CROSS PIECES
STABILIZER SPAR
1/16" SHEET
ROUND TIPS AFTER CARVING
BLOCK 4 1/2" x 5/8" x 1 3/4"
D
D


1
3
BULKHEADS 1/16" SHEET
K-K
DETAIL B REAR FACE FITS HERE-OPENING SEE SIDE VIEW
MASTER STRINGERS FIT HERE
5
8
K-K
2
4
6
7
NOTCH FOR LANDING GEAR CROSS PIECES-S
FORMER PANEL J
FIT BLOCK A
THREAD CONTINOUS .028 WIRE
PIECE S MAKE-2
FIT TO R
PIECE R
MAKE-2
FRONT
1x3/8
1/16" ALUM. TUBING
STIFF PAPER DISCS
DETAIL-P
REAR BEARING
2 PIECE CRANKCASE
14 CLYINDERS

The fast new Army Seversky advanced trainer used at Randolph Field

Frontiers of Aviation

By ROBERT C. MORRISON

Latest Developments in American Sportplanes and Giant Transports—How to Build a Scale Fairey "Battle"

IT IS an unquestionable fact that the United States leads the world in the performance of her military and commercial airplanes, but it has often been doubted that she holds the same lead in the sportplane field. England especially has steadfastly produced small planes that are equal or perhaps better than our sport ships. However, as is the usual American custom, we are not apt to permit anyone to keep ahead of us. Hence the several new sportplanes that have been completed recently.

Among these is the Aeroneer, a two-place, low-wing, all-metal sportplane that is exceptionally clean in design. Its most important feature is perhaps the fact that it is all-metal. The Aero Engineering Corporation, builders of the plane, claim that it is America's first moderately priced, all-metal, full cantilever, transport styled, private utility airplane. It fulfills all the requirements of the modern private owner. Accessories include the following:

Eclipse electric starter, differentially acting hydraulic brakes, fixed pitch propeller, airspeed indicator, altimeter, tachometer, fuel pressure gauge, oil temperature gauge, oil pressure gauge, wing flap position indicator, pitot static tube, three fuel level gauges, fire extinguisher, first aid kit, engine and aircraft logbooks, and engine tool kit.

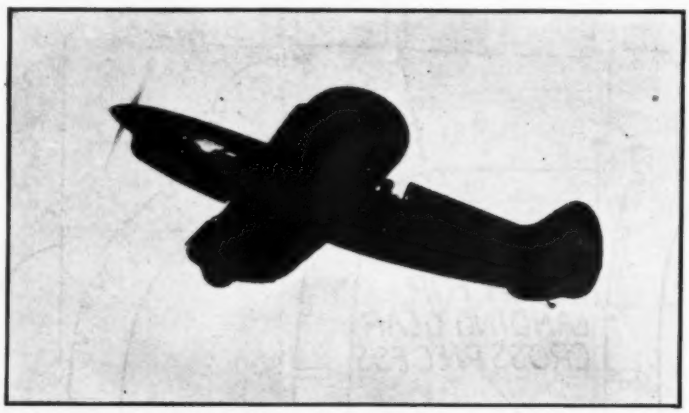
The power plant is a Menasco C-4 in-line engine rated at 125 hp. at 2175 r.p.m. Fuel consumption is 7.8 gallons per hour at cruising speed; oil consumption ⅛ gallon per hour. 95, 150 and 160 hp. Menasco engines may also be installed without any modification of engine cowl and fairing other than replacing the engine mount and engine controls.

Performance of the plane powered by the 125 hp. engine and carrying a full load for long hops of 1800 pounds follows:

High speed—147 m.p.h. at sea level
Cruising speed—138 m.p.h. at 8,000 ft.—at 75% of rated hp.
Landing speed (with flaps)—46 m.p.h.
Landing speed (without flaps)—54 m.p.h.
Rate of climb at sea level—750 ft. per min.
Gliding angle (flaps retracted)—13.4 to 1
Service ceiling—15,600
Cruising range—700 miles
Miles per gallon—17.5 in cruising flight
Climb to 8,000 ft. from sea level—14½ min.

Lightly loaded (weight 1,400 pounds) the ship has the following performance:

High speed—150 m.p.h.
Service ceiling—19,500 ft.
Rate of climb at sea level—1,100 ft. per min.
Landing speed—41 m.p.h.



The new Brown B-3 sportplane with a Menasco super Buccaneer engine

Dimensions

Wing span—32 ft. 6 in.
Wing area—168 sq. ft.
Length—24 ft.
Height—7 ft. 8 in.

Weights

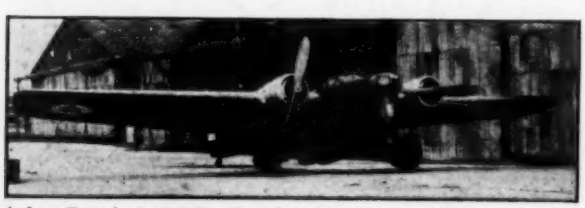
Weight empty—1066 pounds
Useful load—734 pounds
Fuel (43 gallons)—258 pounds
Oil (4½ gallons)—36 pounds
Pilot with parachute—190 pounds
Passenger with parachute 190 pounds
Baggage—60 pounds
Gross weight—1800 pounds
Wing loading—10.7 pounds/sq. ft.
Power loading—14.4 pounds/hp.

The pilot and passenger sit side by side in a roomy enclosure with excellent vision. Each side of the enclosure slides back individually for entrance on either side of the plane. Trimming tabs, adjustable from the cockpit, are employed. The landing gear is of full cantilever single-strut design with differential acting hydraulic brakes and also parking brakes.

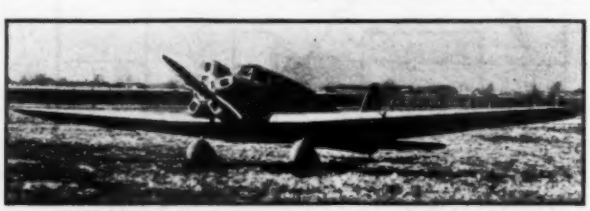
The wing is easily demountable. The wing control cables may be quickly disconnected under the seats when the wing is to be taken off for shipping or storage.

The entire ship is covered with 24 ST Alclad.

Those who are on the engineering and construction staff which has been respon-



A late French Amiot Bomber that flies 200 m.p.h. powered with two 750 hp. motors. It is operated by a crew of five and protected from all angles by machine-guns.



One of the latest Russian sportplanes, the Avianito-1, powered by a 100 hp. Soviet M-11 motor. It took second place in the All-Union Flight, 1935. It carries three people. (Sovfoto)

The Crouch-Bolas 3 place sportplane with slots and flaps. High speed 140 m.p.h.; landing 18 m.p.h.

sible for the excellent performance and quality of the Aeroneer are Dr. Arthur L. Klein, W. C. Rockefeller, Carlos Wood, Milford Childers, all of whom are connected with the Guggenheim Aeronautical Laboratory at the California Institute of Technology, also Malte Swensson and Edward G. Ward of Los Angeles.

The price of the Aeroneer will be well within the range of the moderately priced sportplane of today. There is perhaps no sportplane in the world equalling the combined performance and structural qualities of the Aeroneer with the probable exception of the Curtiss-Wright Coupe.

Another new plane that has been completed is the Brown sport job for Dr. Ross Sutherland. At this writing the plane has been undergoing tests by Larry Brown, its designer and builder. During these preliminary tests a Menasco engine of 250 hp. has been used with low supercharging. The standard model will be equipped with a Menasco of higher supercharging and therefore higher speeds should be obtained with the latter. During the first tests of the plane, it was found that the sleek red monoplane had a top speed of 180 m.p.h. and a landing speed of 45 m.p.h. with flaps and Handley Page slots in operation. When the new engine is installed, Mr. Brown said that the high speed will be increased to almost 200 m.p.h.

The Menasco engine concern has been busy filling orders for England and Australia lately. To prove the world-wide popularity of the inverted in-line Menasco engine, Phillips and Powis of England have recently purchased rights to build Menascos abroad. Last month we related that Harold Neuman had purchased a Menasco engine for his new racing plane. Now comes word that S. J. Wittman has also purchased one for a new racing plane that he has just built. It has also been said that there are some very novel features in the design of Harold Neuman's ship that should make it an unusually fast racer.

United Airlines have ordered 26 Twin-Wasp engines for their new Douglas DST's now under construction. These new engines, just developed by Pratt & Whitney, deliver as much as 1,150 hp. Mr. Charles W. Deeds, vice-president of United Aircraft Corp., recently stated that the time has come when the single-row radial air-cooled engine in large transport operation is as obsolete as the four cylinder automobile engine. He also stated that Pratt & Whitney believes that a normal rating of 750 hp. with an allowable over-power for take off in the neighborhood of 800 to 850 hp. is about the maximum that can be expected from a nine-cylinder single-row engine with safety and satisfactory performance and maintenance. More powerful Pratt & Whitney engines are now being designed.

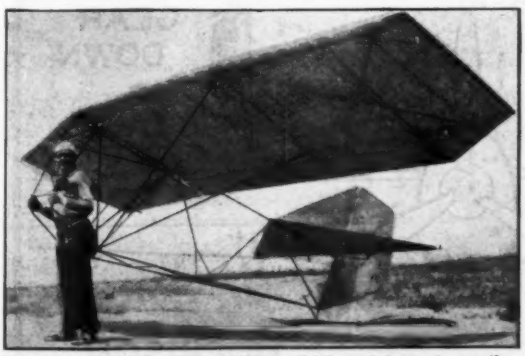
The latest in flying pancakes for sport use. High speed 140, landing 30 m.p.h. It is said to be foolproof. (Soibelman)

Pratt & Whitney's close affiliate, Sikorsky Aircraft, has been breaking many world records for altitude in the past few months with a Pratt & Whitney powered S-43. During these record-breaking flights, Mr. Igor I. Sikorsky, designer and builder of the plane, has also been a passenger. He set up a small laboratory in the plane to gather as much information as possible towards the eventual construction of large transport aircraft suitable for airline passenger service at high altitudes. Mr. Sikorsky believes that transports will be able to fly at 15 to 25 thousand feet altitude, as air conditions are more favorable at that height. Without a doubt, Mr. Sikorsky will design his future airplanes to fly at these heights with slightly supercharged cabins, and obtain very high speeds.

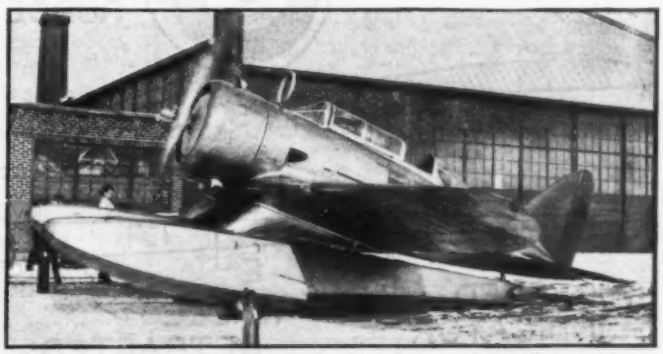
Design work has been completed on his new 50 ton flying boat. Cruising speed of the huge ship, which will be powered by the new Pratt & Whitney 1,150 hp. engines, is estimated to be about 200 m.p.h.

Mr. Sikorsky predicts that the smallest "clipper ships" that will be flying across the Atlantic and Pacific Oceans in the near future will weigh 40-60 tons fully loaded! As we stated in this paper about a year ago, the largest will weigh approximately 200 tons! Sikorsky's next new plane to be built will have a two-hundred-foot wingspan with a hull length of 100 feet. There

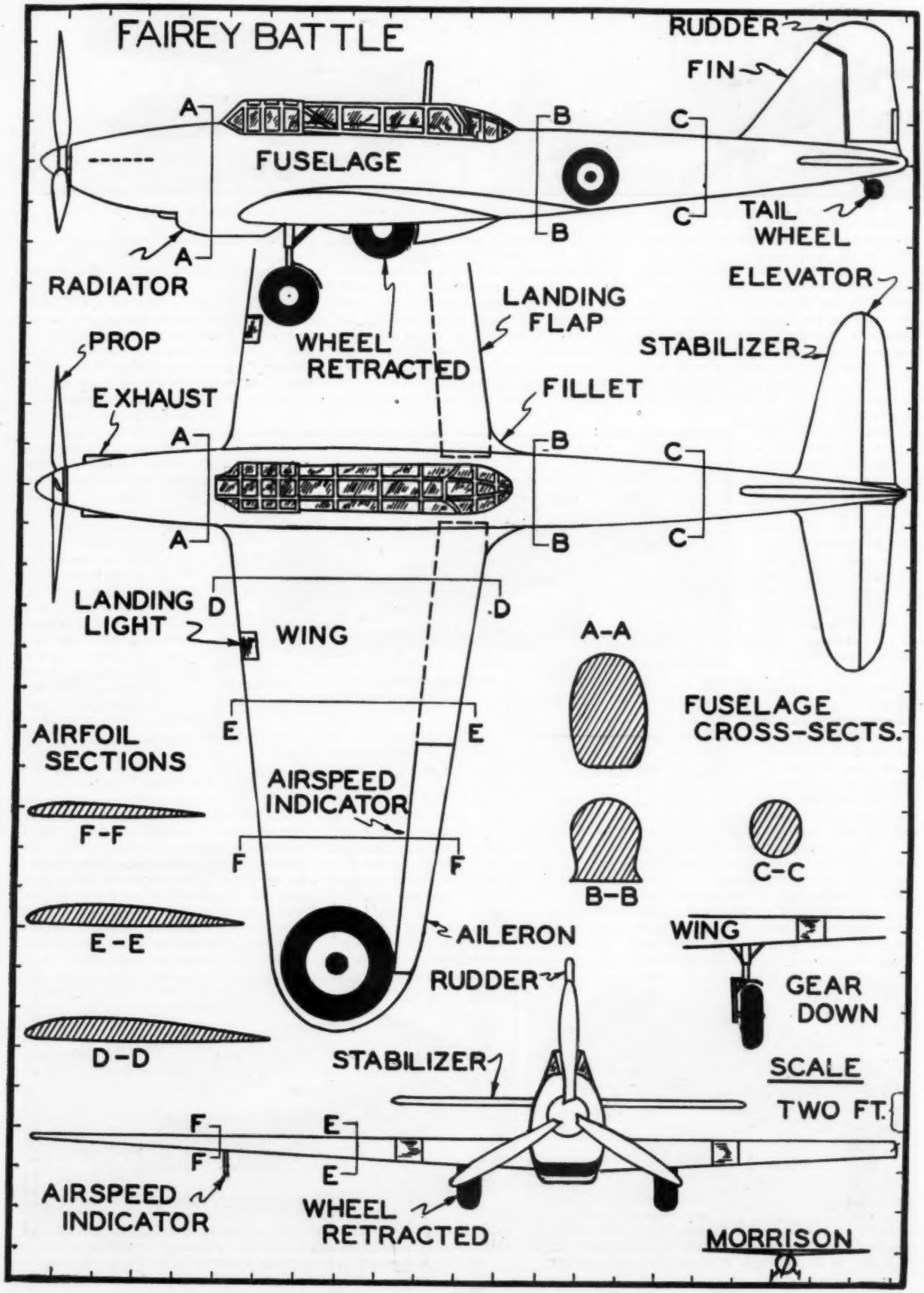
(Continued on page 35)



Bob Morse and his hang glider which weighs only 90 lbs. It flies at 22 and lands at 12 m.p.h. (Int'n. Photo)



The Seversky Amphibian that broke the "Grumman" speed record by 39 m.p.h. It does 240 per.—, and is powered by a 720 hp. Cyclone


FAIREY BATTLE
RUDDER
FIN
A
B
C
FUSELAGE
TAIL WHEEL
RADIATOR
ELEVATOR
LANDING FLAP
PROP
WHEEL RETRACTED
STABILIZER
EXHAUST
FILLET
LANDING LIGHT
WING
D
A-A
FUSELAGE CROSS-SECTS.
AIRFOIL SECTIONS
E
AIRSPEED INDICATOR
F-F
F
B-B
C-C
E-E
AILERON
WING
RUDDER
GEAR DOWN
D-D
STABILIZER
SCALE
TWO FT.
AIRSPEED INDICATOR
WHEEL RETRACTED
MORRISON

Shaping Your Model For Efficiency

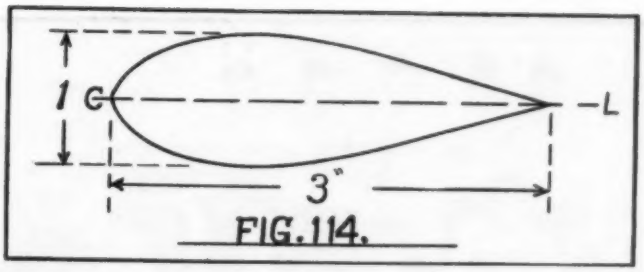


FIG. 114.

How to Obtain Better Flights by Correct Shaping of the Parts—Plans for the Completely Designed Stability Plane

Chapter No. 5—Article No. 53

By CHARLES HAMPSON GRANT

THE general proportions of our stability model and the size and relative position of each part that enters into its design, have been determined in the preceding issues of MODEL AIRPLANE NEWS.

The next and final step to complete its design is to determine the *shape* of each part. This characteristic is not dictated purely by a desire for beauty, although a gracefully shaped plane usually draws more admiration than an ugly one. Strange to say, a model which embodies graceful outlines is usually a more efficient flier than one of angular form. This is not always true, however, for a model of graceful contours may be poorly proportioned from an aerodynamic standpoint, which poor quality usually more than overcomes advantages produced by its grace of line.

In the case of a model of given proportions aerodynamically, however, carefully and gracefully shaped parts will contribute to its efficiency and stability in flight.

Let us now take up each individual part of our model plane and determine the outline or general shape it should have. Of course in assigning a shape to any part, the general design characteristics already established must not be changed or modified.

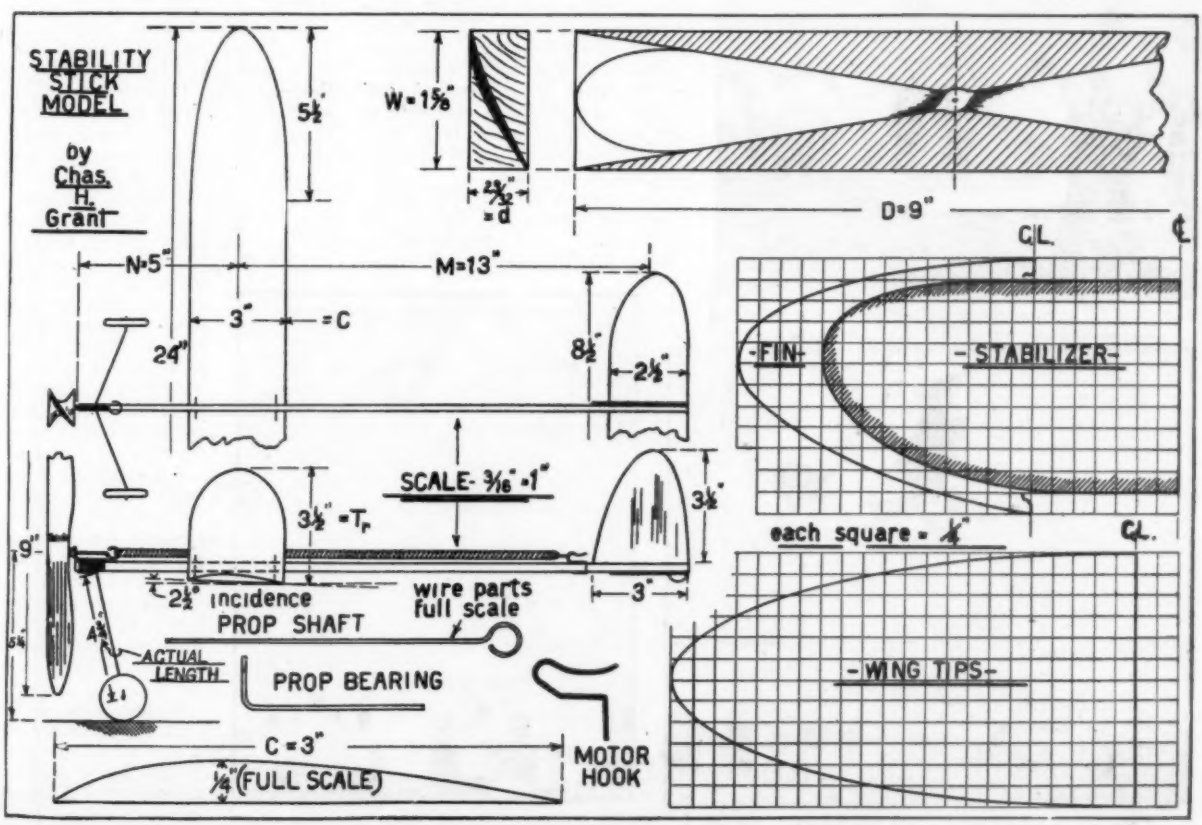
The factor which governs the shape of the parts of a model chiefly is air resistance. In other words it is our desire now to shape each part so that it will offer the least resistance to the air without reducing its contribution to the flight of the plane in respect to its particular function.

The curve which seems to predominate in places that give little resistance to the air, is the parabola. This is a curve of mathematical precision. The curve of the upper surface of an airfoil is usually of parabolic form. A streamlined strut has an outline produced by putting together two parabolas as shown in figure No. 114. Each half of the outline on opposite sides of the center line is parabolic. It is well, therefore, to keep this fact in mind when selecting a shape for any part of your airplane.

Wings

The wings of the model will be the first part to consider. The problem here is to give it an outline that will not only reduce its resistance but will increase its efficiency. In the first chapter it was

(Continued on page 37)



"Gas Lines"

Pictorial Reflections of the First I.G.M.A.A. Contest—What Gas Model Builders Are Doing in Various Parts of the World—Registration of Gas Models

I. G. M. A. A. News

Pict. No. 2. (Left) Winners of the first I.G.M.A.A. contest and their awards. They are, left to right, kneeling, Wm. Dombert, Stephen Kowalik, Maxwell Bassett, Walter Dickerson. The other winners are, Fred Knoll, Carl Thompson, Bob Long, Julius Gottlieb, Edward Stender, Roland Salvatore and Sherwood Castles

Pict. No. 3. Mr. George Forster presents a Forster Brothers engine to Maxwell Bassett, duration winner

Pict. No. 7. Contestants and their gas steeds weighing in and receiving their fuel allotment

Pict. No. 5. A clever biplane gas job takes the air

AT THE 1932 National Contest at Atlantic City, New Jersey, Maxwell Bassett of 11th Street and 66th Avenue, Oak Lane, Philadelphia, Pa., startled the adherents of rubber power by flying a gasoline-powered model successfully, and robbing them of many of the glories of the contest. Since that time gas model activities have grown to enormous proportions. Its development during the past year has been greater than that of all previous years, until at present there is as much activity and interest in gas models as in rubber-powered models. It seems that the imagination of young men has been captured by the idea of flying a model airplane with a real, honest-to-goodness gasoline motor. This form of power naturally brings into the problem additional difficulties which must be recognized and solved. Possibly this challenge to the ingenuity of model builders is largely responsible for the intense interest in this sport.

Recognition of this by MODEL AIRPLANE NEWS has led to the formation of the International Gas Model Airplane Association, which at the present time boasts of members from all parts of the world, though the Association is only six months old. In the July issue of this magazine, news of the first I.G.M.A.A. contest was printed. Unfortunately pictures were not received before the magazine had to go to press. Therefore, we take pleasure in presenting many interesting shots that were taken at the contest.

Picture No. 1 shows Bob Long's model just after taking off while it was climbing for altitude. Bob lives at 209 Greenwich Street, Reading, Pa. His models have always been consistent fliers and this model won seventh place at the contest.

Picture No. 2 shows a group of the winners at the contest. At right center is Maxwell Bassett, showing the I.G.M.A.A. trophy which he now holds and a Forster Brothers engine which was given him for his achievement. At the left center is Stephen Kowalik of 412 South Heald Street, Wilmington, Delaware, who won the Junior Motors Corporation trophy for exhibiting the greatest consistency of flight. He had the greatest time for any three official flights. He also won a set of M & M Air Wheels. The other young men were winners of the second to tenth places for greatest duration.

In picture No. 3 we catch Mr. George Forster of Forster Brothers Company presenting Maxwell Bassett with the Forster Brothers engine which he won by a flight of twenty-four minutes, eighteen seconds.

Picture No. 4 is very characteristic of a gas model contest. In the foreground is a close-up of the nose of one of the gas jobs

Pict. No. 8. A model "stunts" for the crowd

which has been assembled ready for action. In the background several industrious young men put the finishing touches to their "winged hopes."

Biplanes are scarce among gas models. It seems that there are not many stable and successful jobs of this type. It is generally due to the fact that for any given amount of propeller torque the wing span is smaller than in a monoplane. This condition makes the torque unusually effective in reducing the stability of the plane. However, picture No. 5 shows one of the biplanes at the contest which flew exceedingly well. The ship has just taken off and is on its way.

In picture No. 6 Walter Dickerson of 129 Badger Avenue, Newark, New Jersey, looks immensely pleased as he received a Hurlemann engine which is being presented to him by the director of the Association, Mr. Charles Grant. Dickerson won second place in the duration event with a flight of nine minutes, eighteen seconds.

Picture No. 7 indicates the orderly fashion in which contestants were handled when gassing up their planes. Here is a line of fellows waiting to have the gas put in their jobs. 1/16 oz. of gas for every pound of model was allotted to each one. Though this seems a very insignificant amount of fuel, the results of the contest clearly indicated that this allowance is sufficient and will produce flights of exceptional length. The contestants seemed very happy about this inasmuch as only one plane was lost among the 160 gas jobs at the contest. This is a record, because at all other contests at least two or three ships have flown out of sight and were not recovered.

It is requested that if anyone who reads this column knows of a gas model which has been apparently lost that he notify MODEL AIRPLANE NEWS, 551 Fifth Avenue, New York City, immediately. John Ginetti of Atlantic City lost one airplane at the contest in the neighborhood of Metuchen or Perth Amboy.

Stephen Kowalik may be seen in the center of picture No. 7. His gas job, which won the Junior Motors trophy, is shown to his right. It is resting on the ground and is the most prominent plane in the picture.

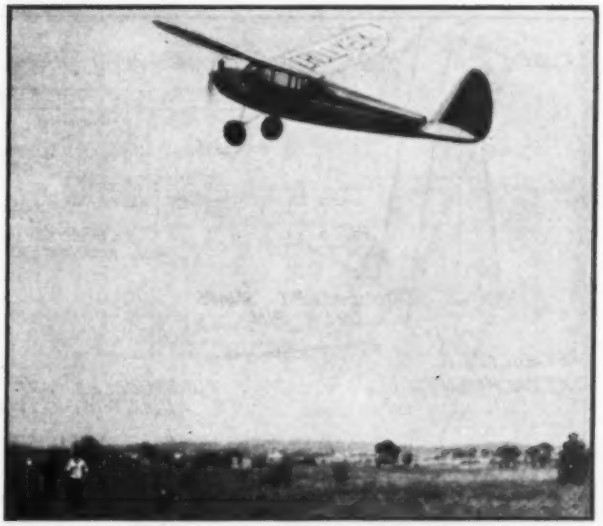
Picture No. 8 shows a typical scene at the contest immediately after the take off of a cabin job. The spectators are contributing to the number of cases of "neckitis," a disease prevalent among aviation fans. The peculiarity of this disease is that they get the pain in their own neck instead of giving it to others.

The most unusual plane in the contest is shown in picture No. 9, just as it left the runway. This plane was built by Roland Salvatore of 205 Valley Brook Avenue, Lyndhurst, New Jersey, who is a member of the C.S.S. Club of Lyndhurst. The ship was unusual inasmuch as the motor was mounted high above the wing. Though this is not orthodox, according to the design of gas jobs seen up to the present time, it performed beautifully. The designer of the model was exceedingly clever in overcoming difficulties usually encountered in this type of ship.

The C.S.S. Club was organized two years ago in order to experiment with gas jobs. Its members are Sherwood Castles, Edward Stender and Roland Salvatore. Anyone wishing to communicate with members of the club should write to the above address.

Picture No. 10 shows a close-up of the motor mounting of Stephen Kowalik's ship. It gives a good idea of the construction of the model and the manner of mounting the engine. Kowalik writes us a little of his history and tells us he had been building models for eleven or twelve years and that he was in charge of the first classes in model construction some years ago at the local Y.M.C.A. and boys' club in Wilmington, Delaware. Since these classes have been held model builders have increased from a mere handful to more than three hun-

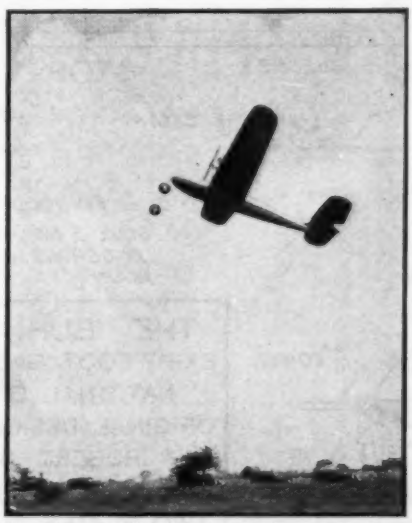
(Continued on page 43)



Pict. No. 1. Bob Long's model leaps skyward for seventh place

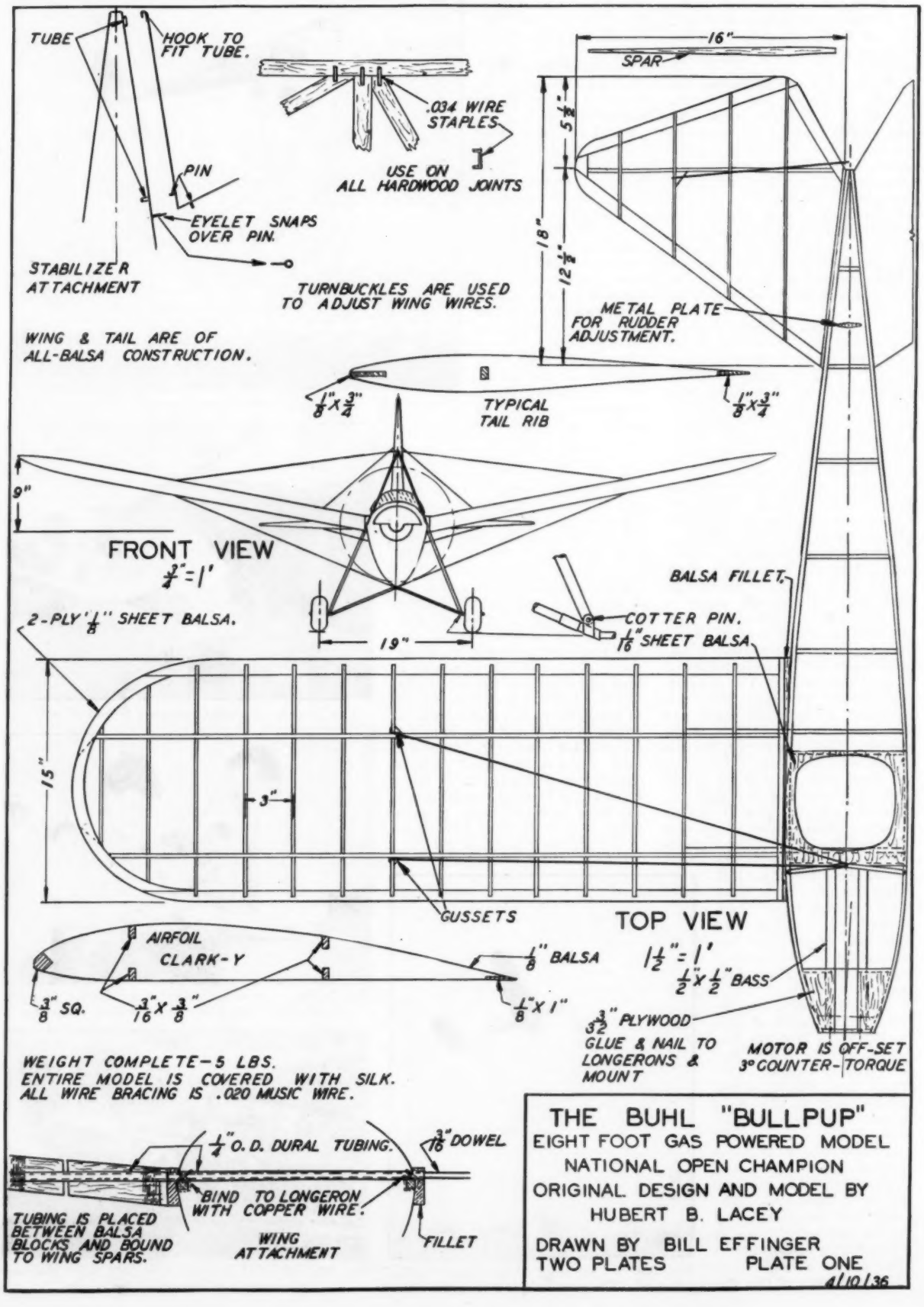
Pict. No. 4. A model transport becomes "nosy"

Pict. No. 6. Mr. Grant, I.G.M.A.A. director, presents a Hurlemann model engine to Walter Dickerson



Pict. No. 9. Salvatore's "high motor" plane takes off. The most unique ship at the contest

Pict. No. 10. A close up of Kowalik's plane, showing the manner of mounting the engine



THE BUHL "BULLPUP"

EIGHT FOOT GAS POWERED MODEL

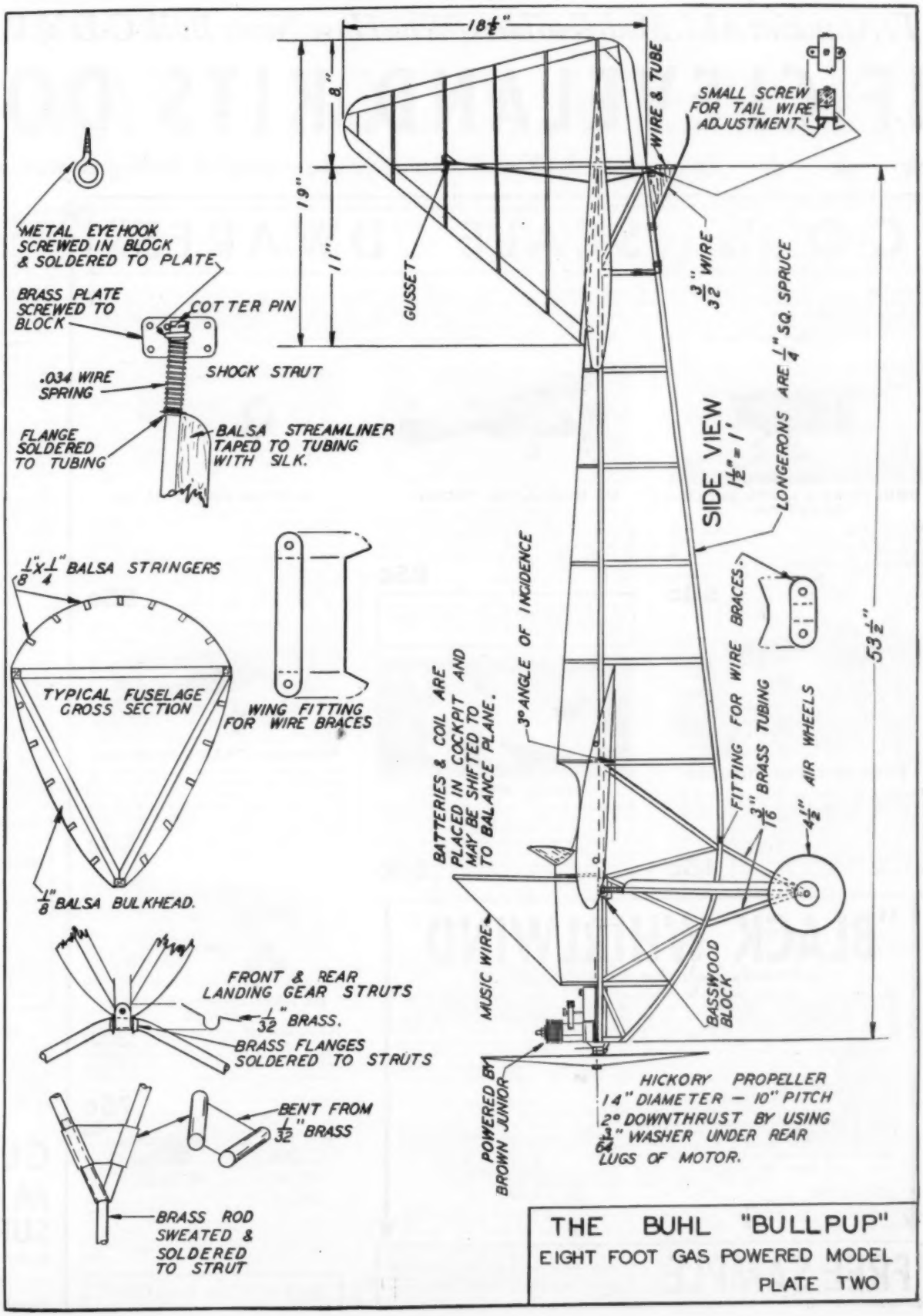
NATIONAL OPEN CHAMPION

ORIGINAL DESIGN AND MODEL BY HUBERT B. LACEY

DRAWN BY BILL EFFINGER

TWO PLATES PLATE ONE

4/10/36


18½"
8"
19"
11"
WIRE & TUBE
SMALL SCREW FOR TAIL WIRE ADJUSTMENT
GUSSET
3/32" WIRE
LONGERONS ARE ¼" SQ. SPRUCE
METAL EYEHOOK SCREWED IN BLOCK & SOLDERED TO PLATE
BRASS PLATE SCREWED TO BLOCK
COTTER PIN
SHOCK STRUT
.034 WIRE SPRING
FLANGE SOLDERED TO TUBING
BALSA STREAMLINER TAPED TO TUBING WITH SILK.
SIDE VIEW
½"=1'
⅛"X¼" BALSA STRINGERS
TYPICAL FUSELAGE CROSS SECTION
WING FITTING FOR WIRE BRACES
3° ANGLE OF INCIDENCE
FITTING FOR WIRE BRACES
3/16" BRASS TUBING
4½" AIR WHEELS
53½"
BATTERIES & COIL ARE PLACED IN COCKPIT AND MAY BE SHIFTED TO TO BALANCE PLANE.
⅛" BALSA BULKHEAD.
FRONT & REAR LANDING GEAR STRUTS
1/32" BRASS.
BRASS FLANGES SOLDERED TO STRUTS
MUSIC WIRE
BASSWOOD BLOCK
BENT FROM 1/32" BRASS
BRASS ROD SWEATED & SOLDERED TO STRUT
POWERED BY BROWN JUNIOR
HICKORY PROPELLER 14" DIAMETER — 10" PITCH
2° DOWNTHRUST BY USING 3/64" WASHER UNDER REAR LUGS OF MOTOR.

THE BUHL "BULLPUP"

EIGHT FOOT GAS POWERED MODEL

PLATE TWO

To Acquaint ALL Modelbuilders (Who Have Never Built C-D's) Withday

IF CLEVELAND KITS DONT

★ ★ ★ *In other words, if you're not more than satisfied, back goes your money and no*

C-D ½" SCALE "DWARFS"

These nine newest models of the sensational C-D line of Dwarfs have been instant hits. These, as well as the others listed on the back cover, are the finest designs in models under $1.00 you will ever see produced, for when the model is completed, value for value compared to Kits of any other make, they are worth from four to ten times as much as any similar priced model. These Kits contain absolutely everything needed to build these beautiful models, *except Liquids*. NO LIQUIDS ARE SUPPLIED WITH C-D DWARF KITS. Models when finished will look precisely like those illustrated here. If you haven't yet tried 'em, order one today and see.

DOOLITTLE'S LAIRD SUPER-SOLUTION

Winner of the Bendix trophy in '31. The first plane to make coast to coast flights exceeding 200 m.p.h. average. Model now authentically redesigned and recommended for exhibitions, also for thrilling flights. Span 10⅝". Suggested coloring: yellow and green. Kit D-5..... **50c**

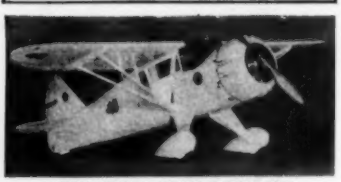
FOKKER D-VIII FIGHTER

Designed by Anthony Fokker it was believed to be the best and most efficient fighter of the time. Built so close to the time of the Armistice that only a few of these dreaded "Flying Razors" got into actual combat. Span 13⅜". Suggested coloring: cream and blue. Kit D-34..... **45c**

DE HAVILLAND "COMET"

Prototype won MacRobertson 11,300 mile England to Australia Race in 71 hrs. Model is high speed flyer, pulled by 2 powerful little motors. Extraordinarily beautiful. Span 22". Kit absolutely complete (but NO LIQUIDS). Kit D51, postfree only..... **85c**

Special Limited Offer: Complete Set of 7 Issues, CLEVELAND MODELMAKING NEWS, only $1.50. Act quick.



"MISTER MULLIGAN"

Thompson Winner of '35, after Turner was forced down. Realistic takeoff; fine steady, fast flying model. Nothing compares with it in elaborate completeness—opening door, super-detail gadgets, etc. Span 15¾". Kit D52, complete except NO LIQUIDS, postfree only..... **50c**

CURTISS CHINA HAWK

Make either the Turkey or China Hawk. These models incorporate all of the latest C-D construction features as the D-49 but the difference in external appearance offers interesting variety. This model is a favorite among fine model builders. Very fantastically decorated. Span 15¾". Suggested coloring: silver with red and white trim. Kit D-50..... **85c**

RICKENBACKER'S SPAD XIII

Col. Eddie Rickenbacker flew to fame in the Spad during the war. Most of his twenty-six victories were fought in it. It was fast and maneuverable, as is the model. Redesigned drawing is authentic as possible to make it, well detailed. Span 13½". Suggested coloring: Yellow and green. Kit D-13..... **50c**

DE HAVILLAND-4 BATTLE-PLANE

The famous U. S. Two Place Fighter-Bomber sent to France, powered with the famous Liberty engine. Extremely interesting to build. Dozens of fine details authentically duplicated. Span 21¼". Suggested coloring: olive drab, black and white checkered trim. Kit D-3..... **75c**

SOPWITH SE-5

Large beginner model. Excellent flyer. Span 13¼". Suggested coloring: Natural cream color. Kit D-9..... **40c**

BISHOP'S NIEUPORT

Pride of Canada's ace, who assisted in our redesigning. Span 13¾". Suggested coloring: Silver and blue. Kit D-12..... **50c**

See Our Ad on Back Cover!

"BLACK WHIRLWIND"

is the only name that really describes it!

One foot of it stretches ten feet and lubricates as it stretches! This silvery-sheen pure Para (pronounced, not Par'-a—but Pa-rah') rubber is absolutely the best rubber for giving snap and power—take our word for it. It is made especially for us and is called Cleveland "Black Whirlwind" Rubber even though it is actually grayish. Smooth on both sides for greater efficiency (no roughness or cloth weave appearance).

These three factors—the great stretch, the lubricating quality of the preparation applied to it, and its smoothness to prevent chafing when winding tightly, to say nothing of its pure wild rubber characteristics—make this rubber outperform *any* other for model aircraft use.

Cleveland "Black Whirlwind" Rubber is far superior to *any* model airplane rubber containing a coloring matter—which, at best, only adulterates the rubber, tending to make it weaker and less snappy, as any one who knows about rubber can tell you. Don't be misled by the statement that any colored rubber is a natural contest winner, for only pure Para rubber is the snappiest, most powerful and "stretchiest" rubber, and coloring it would only tend to reduce, not increase, its efficiency.

Just watch the swing to Cleveland "Black Whirlwind" Rubber!
TRY IT! SEND FOR SOME TODAY.

1/32 x 3/32 flat		1/32 x 1/16 flat		1/32 x 3/16 flat	
7½ ft.	$ .03	7½ ft.	$ .04	7½ ft.	$ .05
25 ft.	.09	25 ft.	.12	25 ft.	.16
50 ft.	.17	50 ft.	.22	50 ft.	.30
210 ft. skein	.60	210 ft. skein	.85	210 ft. skein	1.10

FREE SAMPLE

Enough to motor a baby R.O.G., sent with all orders for one or more C-D Kits—if this coupon is enclosed. If only "Black Whirlwind" Rubber is ordered, the regular 15c supplies packing charge applies.

★ Maybe some of fellows w never bought C have been them by the pro other co maybe you've b away by the fancy claim make, hav kits, been disap d figure *could possibly be the cla* If you're one of ows—*thi is meant for you.* If we've in getting it to you've been taking care of ing list o and customers haven't bee do every thing we—and pa make a sporting on to th that's just becom sceptic all model comp se of hi perience with s n). Just day another lem e of you was so urgent can't w longer. *"I just my first —and the surpri life! I r no idea my could buy value. Of cour en your just figured you e all th only larger. Nothing to me that why you is becau getting the busin you've ge business becaus giving M the MONEY. We could thing to wake modelbuilders they're missing getting* Read that again —and our is in the big box ve. So, *of these C-D K either fr dealer or direct you op and carefully if it greatest value money ow ket* (remember, that no are included in , *return full refund of ase price* sporting and fai Well, yo that's the way transactio Cleveland are why the Cleveland friend ning the Don't hesitate C-D Ki And remember— buy simil at anything like prices—i Order today—as for you our risk, what and th and thousands dy found namely, that you k disapp in ordering a Eyes even Grandmother p would the finest value rticular n America—bar no der yours

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MODELMA RAFTSM

Here's the mos Modelmakin "Practical Hobby ever produc pages, 8½x11" bursting seams with infor hard-to-ge at regular or low rtised price C-D Mode cludes not only plane Kits and Gas Mod other Supplies, and Ship Yachts, Engines, iniature Mil plies, Plastics, Fittings, ery, Kayaks, etc. thusiast d be without it. to be pla list to receive summer.

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We repeat—plea at dealer he hasn't the C ant, order enclosing check order (C your own risk). .O.D.'s. Mexico, British mers—add all other countr

CLEVELAND MODEL SUPPLY CO. I

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1866N th St.,
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day's Greatest Value in Flying Model Airplanes, We Make This Offer:

T MAKE GOOD, WE WILL!

d no questions asked. Read every word of this remarkable C-D offer! ★ ★ ★

CLEVELAND 20-INCH "REPS"

You're missing a world of thrills if you haven't yet built any of these popular new REP (Representative-Duration) models. Just look what each Kit includes: Full size, detailed mechanical drawings—bulkheads, etc., drawn out for repairs. All wood printed out. Finished scale wood wheels. Fine turned cowl front or drilled nose supplied. Fine bearing button. Finished balsa prop. Real "Whirlwind" rubber. Real celluloid for windshields. All strip wood of the finest quality accurately cut to size. White Japanese covering tissue. Insignia and wing lettering supplied printed out. Wire, washers, etc., etc.—Absolutely everything needed (even scale prop material, always omitted by others) except the liquids. Remember—these Kits contain NO LIQUIDS!

HAWKER LOW WING FIGHTER

England's latest interceptor fighter. Sleek fuselage, plenty of area, a very swift flying model. Landing gear fully retractable as on the prototype, coloring suggested, all silver; insignia supplied. Kit R-59, complete (except liquids), postfree only..... **50c**

GRUMMAN F2F-1 FIGHTER

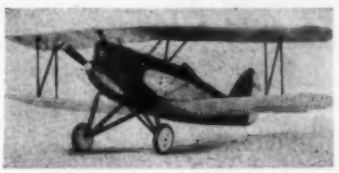
Latest Navy fighting ship, still on secret list. Big wing area makes model splendid flyer. Drawings cover both retracted or extended landing gear. Kit R-53, complete (except liquids), postfree, only..... **50c**

RYAN SPORTSTER ST

This beautiful little two place jobs is well known to model-builders everywhere and our model looks as pretty as does the prototype. Span of course 20", suggested coloring, all silver, like the prototype. Model stable and fast. Kit R-58 complete (except liquids), postfree, only..... **50c**

CURTISS HAWK P6-E FIGHTER

Hard to tell this actual 20" model photo from our ¾" model. Full of typical C-D authentic features and details. Speedy flights. Kit R-21, complete (except liquids), postfree, only..... **50c**



GREAT LAKES SPORT TRAINER 2T1-E

This fine flying model Kit, another experimental "REP" Kit (yes, its ¾" scale, too—and better than the one that used to sell for $5.50), suggested coloring, orange and black. Kit No. R-X5003, complete (except liquids) only **50c**

Portfolio of C-D Drawings

A $15.80 Value for ONLY $1.50

Yes, an unbelievable value in C-D's at a next to nothing price which will allow you to further complete your files of fine drawings—a $10.00 value in ¾" scale flying models and two ⅜" scale flying models alone, to say nothing of what you would have to pay for 55 authentic ¼" scale solid model plans showing fuselage, cross section, etc., and three 3/16" scale solid model plans of the same quality. At ten cents each, these drawings, if purchased regularly, would cost $5.80, making the total buy really worth $15.80, and you can have the complete lot for the tiny sum of only $1.50, postfree anywhere in the world.

Here is what the ¾" scale drawings are: 1. The famous Boeing P4B-3 Fighter. 2. Fokker D-8 Wartime Fighter. 3. Doolittle's Gee-Bee. 4. Hall Racer. 5. Tilbury Funday Flash. 6. Heath Parasol. 7. Monocoupe. 8. Boeing 95 Mail. 9. Nieuport 28 Wartime Fighter. 10. Comper Swift Lightplane. 11. The Aeronca C-3 Sportsplane. 12. The famous Vought Navy Corsair.

The ⅜" scale models consist of Lindbergh's famous Lockheed Serius and an advanced training soaring plane.

CLEVELAND AMPHIBION

An experimental "Rep." Span 27". Twin Motored Sikorsky-like in lines. Will R.O.W. beautifully. Graceful flights. Kit R-X5001, complete (except liquids), postfree, only..... **60c**

FOKKER D-7 FIGHTER

This actual 20" model photo is almost a twin in looks to the photo of our ¾" model. Be sure to get it. Kit R-15, excellent flight, complete (except liquids), postfree, only..... **50c**

"MR. MULLIGAN"

This really is a swell flyer—and a typical C-D authentically detailed job. In big demand—better hurry. Kit R-52, complete (except liquids), postfree, only..... **50c**

HUGHES RACER

Silver and blue model of the 350 m.p.h. super-speed flyer—nearest approach yet to a rocket ship. Retractable landing gear. Kit R-54, complete (except liquids), postfree, only..... **75c**

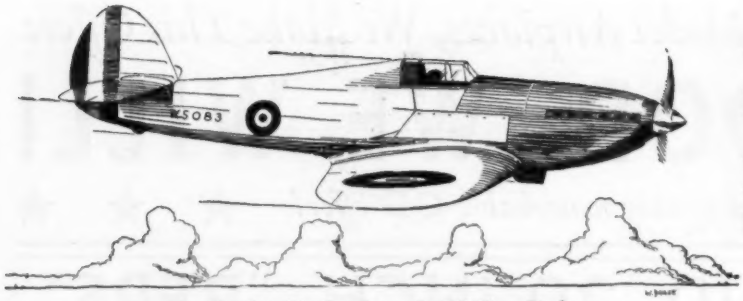
CLEVELAND PIRATE BOMBER

An experimental "Rep." Span 28". Resembles Keystone Army Bomber. Fast, steady, long flights—twin motored. Kit R-X5002, complete (except liquids), postfree, only..... **60c**

Mr. Dealer:

THE C-D PLAN IS A 3D PLAN!

And that means *Double Duty Dollars*—the kind that work harder, work faster, work longer. Every dollar invested in C-D's brings back more dollars, lots of 'em—and keeps bringing 'em back! C-D Kits make friends that bring back friends, and quick profit dollars keep rolling in. Here is the fastest "turnover" in model airplane kits in America—*don't try to get along without it!* Let C-D's start bringing more business to your store, RIGHT NOW. Write at once for full dealer data.



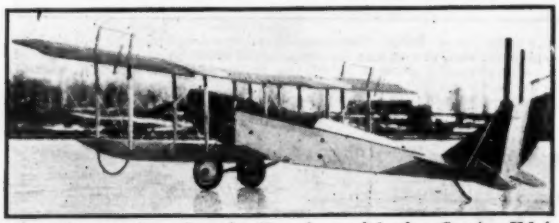
The Hawker Merlin, drawn by William Drake

AIR WAYS

HERE AND THERE

What Readers Are Doing to Increase Their Knowledge of Aviation in All Parts of the World. Send Pictures and Details of Your Experiments

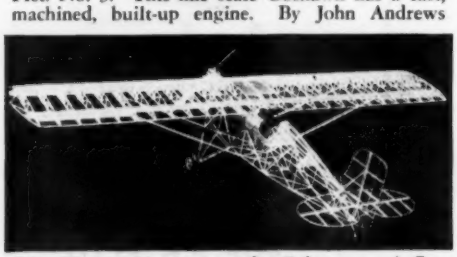
Air Ways Club Contest



Pict. No. 1. A perfect detail scale model of a Curtiss JN-4, by Edwin Davis. Looks like a real plane, doesn't it?

Pict. No. 2. A fine example of a solid scale China Clipper by Ralph Hammer

Pict. No. 3. This fine scale Goshawk has a cast, machined, built-up engine. By John Andrews



Pict. No. 6. Here's some detail for you. A Corbin Super Ace, by Frank Heck

Pict. No. 4. A well designed flying model by John Hardin

HERE we are again; this time with something that we believe will interest all Air Ways Club members. A contest has been planned for some time, the official name is to be the Air Ways Club Design Contest. You are now going to have a chance to show how well you can design a simple stick model airplane. Do not think that this is beneath your ability, for it is not what you design that counts but how well you design it. More difficult models will follow in succeeding contests.

All that you have to do to enter this contest is send in a plan of a simple stick model designed for duration (of which stability is of first importance), with a wing span not exceeding twenty-four inches. You are free to design any type or shape of model. This project is similar to those which present themselves to big airplane designers where a large airplane must be designed for a particular purpose. The plans should be on one page within a border of seven by fourteen inches. All parts necessary to build a model should be shown according to a scale which is of your own choosing. Thus you have another problem to consider; that is, the manner of showing this model in the form of a plan. The plans should be submitted in ink. They will be judged on the following points:

1. The design characteristics of the model.
2. The character of the construction of the model.
3. The manner in which the plans are laid out on the page in respect to their clarity of meaning; that is, the ease with which the person building the plane may understand the plans.
4. The neatness of the drawing.

All plans will be judged on the basis of these four qualifications. The decision of the judges will be final. Awards will be given for the ten best drawings. The first place award will be $20.00; the second, $12.00; third, $7.00; fourth, $3.00; fifth, sixth, seventh, eighth, ninth, and tenth, $2.00 each. The contest is open only to Air Ways Club members and should be of immense value to them in their aeronautical education. Be sure to give your membership number on your entry. This will help you to realize the factors that enter into designing a ship and will give you a great thrill to put your ideas down on paper. No drawings will be returned unless requested and return postage is sent with the drawing.

Later a flying contest is planned in which Air Ways Club members may enter the models which they design and thus prove the worth of their ships. Announcements concerning this will be made in a future issue. In making your drawing we suggest that you use two-ply bristol board. This usually produces the clearest drawing of any material you may wish to use, as the surface is smooth and hard and it takes ink very well. Special attention will be given to the aerodynamic characteristics of the design, in respect to its stability and efficiency. First of all, the ships must be stable. Here is something well worth your effort, not only in respect to prizes but in regard to the amount of knowledge you will gain from en-

Pict. No. 7. A clever flying scale Darmstadt D-22, by Elbert Weathers

Pict. No. 12. This remarkable model D.H. Moth is like the big ship in every detail even to the type of material used. Made by Brian Southwell

tering this contest. Get busy and have your finished entires in before the closing date of the contest, which is midnight of August 21st. The results of the first contest will appear in the October issue. The best plan will be pubdished in MODEL AIRPLANE NEWS. In making these plans, think over all the factors involved before you start to design your model or put it down on paper. Read over the points on which the contest will be judged, this will help you extremely.

Best of luck to all club members!

Now we have some news from members, many of whom have sent us pictures. William C. Drake of 3 Pine Street, Malden, Mass., one of our old artists, has honored us with a drawing of the new Hawker "Merlin," one of the latest British pursuit jobs. It appears in the heading of the column. It is remarkable how some young men can put life into a pen.

Edwin C. Davis of Dollar Bay, Mich., has sent to us what we consider the best picture received this month, picture No. 1. When we say "best" we not only mean the photography but the model itself and the manner in which it is built. The model is one of an old "Jenny" or Curtiss JN-4. This ship was used for training during the World War. Though not a modern plane, this is a famous job and Davis has done full justice to it. The model is very beautifully made, every detail has been given careful consideration. You will note the fact that it is very difficult to distinguish this model from a large plane. Davis tells us that the only parts he did not make on this model are the wheels and axle. The wheels are one inch aluminum, rubber-tired. Davis started to build this model in 1923 and has evidently taken his time and made every part with the greatest of care. The model itself has a span of 18⅝" and was made to a 1/14" scale. The various parts are constructed mostly of solid walnut and bamboo. The struts and propeller are maple.

Picture No. 2, of another unusual model, was sent to us by Ralph Hammer of Saint James, New York. It is a China Clipper which Hammer has made of white pine with a wingspread of four feet, two inches. Hammer says that it took 125 hours to complete the job. One of the most ingenious features is the propellers. These are made of ⅛" wire. The wire has been flattened in order to form the blades.

In picture No. 3 you see a twenty-inch solid Curtiss Goshawk, made by John Andrews of 145-36 19th Avenue, Whitestone, New York. He says:

"The model contains everything a scale model should contain, plus an all-metal miniature Wright 'Whirlwind' engine 2¾" in diameter. Most of the parts for this engine were cast, machined and then assembled into a complete engine."

It is one of the most unusual jobs we have seen.

Now we have a flying model for your consideration, shown in picture No. 4. It was built by John Tyson Hardin of 811 Jefferson Street, Macon, Mississippi, and is of exceptionally fine design. The workmanship is without fault. We are sorry we can give you no more information about this model, but Hardin tells us nothing concerning it. You will have to use your imagination as to its performance.

A picture of a Boeing 299 has been sent to us by A. F. Thamm of 61 Ellington Avenue, San Francisco, Calif. It is shown in picture No. 5. It took fifth place in the San Francisco Wing-Junior Birdmen of America, Ninth Grade Inter-Scholastic event held at the National Guard Armory, San Francisco, on April 24th and 25th, 1936. It took seventy-five hours to complete.

Next we have a fine example of the model builders' art. It is a Corbin Super

Pict. No. 5. A. F. Thamm made a fine job of this scale Boeing 299

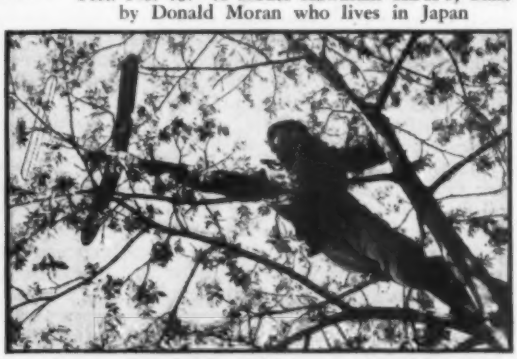
Pict. No. 10. Young model builders of England at the elimination contest for the Wakefield International Trophy, held for the purpose of choosing six builders who came to America to compete for this trophy at the International Contest at Detroit

Pict. No. 11. Mr. Gordon Smith and a group of models built by members of his club in New Zealand

Pict. No. 8. A carefully detailed model of a "Pilgrim 100-A" by Robert Gilmore. Some job!

Pict. No. 13. A model Kawasaki KDK-5, built by Donald Moran who lives in Japan

Pict. No. 14. Winners of the Eastern States indoor meet at Lakehurst, N.J., and the director, Mr. Nathan Polk. Left to right, Bruno Marchi, Mr. Polk, Merrill Malley, Ervin Leshner



Pict. No. 9. John Burns picking apple blossoms at Van Cortlandt Park, N.Y. during the New York Univ. Contest

OFFICIAL NATIONAL MODEL AIRCRAFT RECORDS AS APPROVED BY THE CONTEST BOARD OF THE N.A.A. CORRECTED TO MAY 30, 1936

INDOORS

STICK MODEL AIRPLANES—Hand launched

CLASS B:	Junior	Roy Carlson	Springfield, Mass.	16m 45.6s
	Senior	Wilbur F. Tyler	Boston, Mass.	20m 50.1s
	Open	William Latour	Philadelphia, Pa.	15m 17.8s
CLASS C:	Junior	John Stokes, Jr.	Huntingdon Valley, Pa.	20m 53s
	Senior	Mayhew Webster	Philadelphia, Pa.	23m 12.2s
	Open	Carl Goldberg	Chicago, Ills.	23m 29.3s

STICK MODEL AIRPLANES, R. O. G.

CLASS A:	Junior	William Wert	Philadelphia, Pa.	10m 26.4s
	Senior	Merrell Malley	Atlantic City, N. J.	10m 56.4s
	Open	Joseph Matulis	Chicago, Ills.	9m 59s
CLASS B:	Junior	Bruce Mackler	Atlantic City, N. J.	10m 22s
	Senior	Mayhew Webster	Philadelphia, Pa.	16m 33s
	Open	William Latour	Philadelphia, Pa.	14m 02.8s

CABIN FUSELAGE MODELS, R. O. G.

CLASS B:	Junior	Robert Jacobson	Philadelphia, Pa.	10m 44s
	Senior	Charles Heintz	Philadelphia, Pa.	13m 12.2s
	Open	Beorgevin Becksted	Chicago, Ills.	11m 26s
CLASS C:	Junior	John Stokes, Jr.	Huntingdon Valley, Pa.	15m 05.6s
	Senior	John Haw	Philadelphia, Pa	17m 14.8s
	Open	William Latour	Philadelphia, Pa.	12m 31.8s

OUTDOORS

STICK MODEL AIRPLANES—Hand launched

CLASS C:	Junior	Junior Dague	Tulsa, Okla.	21m 04s
	Senior	Harry Cornish	Denver, Colo.	61m 09s
	Open	Joseph Frady	Tulsa, Okla.	27m 07s
CLASS D:	Junior	Fred Skafes	Akron, Ohio	8m 21.6s
	Senior	Daniel Clini	Springfield, Mass.	38m 50s
	Open	C. M. Miller	Akron, Ohio	11m 20.5s

GLIDERS—Tow launched

CLASS C:	Junior	Marx Brook	Brooklyn, N. Y.	43.5s
	Senior	Bob File	Columbus, Ohio	23m 13s
CLASS D:	Junior	Paul Durup	Boston, Mass.	57.8s
	Senior	Dick Everett	Elm Grove, W. Va.	2m 38s
	Open	Roland Buhrig	Canastota, N. Y.	1m 18s
CLASS E:	Senior	Jack Smith	Dayton, Ohio	1m 23.4s

CABIN FUSELAGE MODELS, R. O. G.

CLASS C:	Junior	Fred Smith	Denver, Colo.	27m 40s
	Senior	Robert Cahill	Indianapolis, Ind.	33m 00s
	Open	Beorgevin Becksted	Chicago, Ills.	39m 30s
CLASS D:	Junior	Alan Starr	Atlantic City, N. J.	4m 41s
	Senior	William Ying	Rosebank, S. I., N. Y.	41m 19s
	Open	William Atwood	Glendale, Calif.	13m 14s

GASOLINE-POWERED

CLASS E:	Senior	Joseph Kovel	Brooklyn, N. Y.	64m 40s
	Open	C. M. Miller	Akron, Ohio	29m 11s

Ace model which has been built in extreme detail by Frank P. Heck of 5439 Brynhurst Avenue, Los Angeles, Calif. It is shown in picture No. 6. You will note that even the ribs have been built up with the greatest of care. The model has a span of twenty-two inches and an overall length of fourteen inches, and is built entirely of balsa wood with the exception of the cowling and gas tank. The cockpit includes all the necessary instruments and controls. The plane contains approximately 800 pieces and required ten continuous weeks to finish.

Mr. Elbert J. Weathers of 2720 Poinsettia Drive, San Diego, Calif., is one of our veteran model builders. Having built all the usual type of models he has turned to one he feels is unique. It is shown in picture No. 7 and is a model of the Darmstadt D-22, a German sportplane of unusual design. It is a flying scale model built with a monocoque fuselage. Its weight, ready to fly, is 2¾ oz. and is built to a one inch to a foot scale, thus giving it a span of twenty-three inches. The plans of this model will appear in a coming issue of MODEL AIRPLANE NEWS.

A non-flying scale model worthy of your attention is the "Pilgrim" 100-A, shown in picture No. 8, which was built by Robert Gilmore of 1108 East Center Street, Springfield, Missouri, to a ¾" scale and has a wingspread of forty-two inches. Gilmore says that all the rib and stringer spacing is accurately carried out and the interior of the plane is complete with passenger seats and lavatory. It has a dummy Pratt & Whitney "Hornet" engine. Gilmore particularly wants us to note that he would like to hear from any model builders in the St. Louis, Tulsa or Cleveland vicinity who have snapshots or other data on either the Pilgrim 100-A or 100-B.

Picture No. 9 will probably recall vivid circumstances to the mind of most model builders. What the young man in the picture is experiencing has happened at least once in the career of every model builder. The picture shows John Burns of the Bronx, a student of Evander Childs High School, rescuing his model from a tree in which it landed during the annual New York University Model Airplane Contest for high school students. This tree happens to grow in Van Cortlandt Park, where the contest was held. We understand that the model was eventually rescued in good condition and without injury to Burns.

MODEL NEWS FROM OTHER COUNTRIES

England

For the first time in the history of model building, England is sending a team of model fliers to America to compete in the International Lord Wakefield Event at the National Championship Model Airplane Meet held at Detroit, Michigan, from June 29th to July 2nd. When you read this, this contest will have been over and it will have been decided whether or not the Americans retain the Lord Wakefield Cup or whether the ambitious Britishers take it back across the high seas.

Picture No. 10 shows the elimination contest held in England which was for the purpose of determining the young men who would be members of the British team. One of the contestants in the picture is about to launch his model from the runway.

New Zealand

One of our most regular and enlightening correspondents is Mr. Gordon P. S. Smith, who is secretary and manager of the Taranaki Union of Model Flying Clubs of Brougham Street, New Plymouth, New Zealand. He has been kind enough to keep us well posted concerning model activities in that country. Recently at the Kestrel Model Aero Club contest at Sandringham, W. Hopkins staged a remarkable flight of nineteen minutes, out of sight. The flight was timed without the aid of binoculars and the timers did not move from their posts.

In some of the contests in New Zealand, one of which was held during the Easter holidays, it was not unusual to have over 300 entries. In this particular contest there were 340. Thirty-nine sections of the Taranaki Union were present. This is quite remarkable, in light of the fact that the Union has only been in existence about fourteen months.

In Picture No. 11 Mr. Smith is shown with a group of the models built by the New Plymouth Union of which he is the director.

Australia

A picture of one of the finest jobs that we have received from Australia has been sent to us by Brian R. Southwell of 67 Fitzroy Street, Burwood, New South Wales, Australia. The plane was made from the De Havilland Company's drawings. It is picture No. 12. It took eighteen months to build in his spare time. It is built to a 1/6 actual size and the wing span is five feet. As on the original model, the wings are folded. Other details include: differential ailerons, dual control, metal tube shock absorbing undercarriage, elevator and rudder bias gear, spring tail skid, etc. In fact, it is an exact miniature airplane, the materials used being the same as on the real ship. We wish to say that this is one of the finest jobs that we have ever seen. The photograph

(Continued on page 46)

Ways and Means of Gas Model Success

Suggestions From an Expert That Will Enable You to Build Your Gas Job Strong But Light

Part No. 2

By JOSEPH KOVEL

IN THE first part of this article, appearing in the July issue of MODEL AIRPLANE NEWS, hints were given which should prove helpful when designing your gas job. Now let us consider the actual construction of the ship. Whether you are building from your own or from someone else's drawings, remember that accuracy is of the utmost importance. When making your rib templates, don't be satisfied that the template looks like the curve you are going to use. Be sure that it is exactly the curve you want to use. If your template is out a bit here and there, the performance of your ship might be entirely different from what it would have been had you used the correct rib profiles. When making a jig for the fuselage sides, be careful to get the correct slope at the points where the wing and stabilizer are going to be set. A difference of a fraction of a degree might have a surprising effect on the first test hop. True, it is possible for you to make a combination of errors that might cause the ship to fly beautifully right from the start. However, the odds would be all against such a thing happening. Play safe, be accurate!

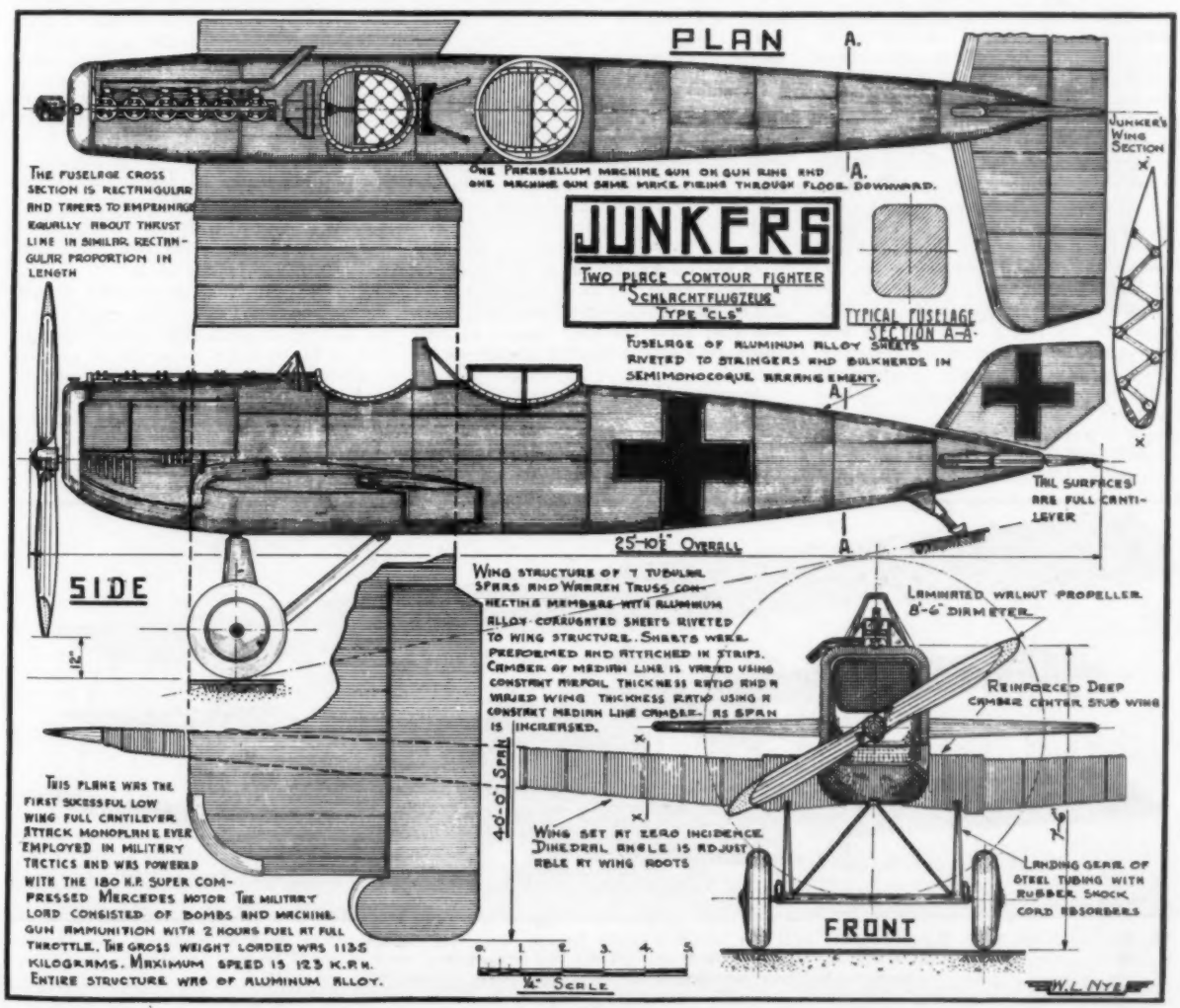
If you're a beginner in the game, it would be advisable for you to start building a ship by making the framework for the tail unit first. This will give you the "feel" of big model construction. Build the wing frame next, taking care not to warp it, then the fuselage frame. Be very careful to make good cement joints. Remember that the ship will have to take a great deal of vibration, and, unless the joints are all perfect, there is a chance of the ship collapsing in mid-air.

When making the fuselage bulkheads, especially those on which the motor-mount will rest, take special care to make them according to plan. If they vary from the plan, the result will be to change the thrust line of your ship, the angles of the wing and stabilizer relative to the thrust line, and consequently the whole performance of the ship.

After you have the framework all made, the next step is the covering job. Start with the fin, then cover the stabilizer, wing and fuselage frame. You may either cover the entire ship with sheet balsa, or cover the entire fuselage, the leading edge, center section and tips with the fin, stabilizer and wing with sheet balsa, with a light grade of silk to cover the balance of the wing and tail surfaces. Each type of covering has its advantages. The all-balsa type greatly strengthens the frames, as mentioned before, while the balsa-silk type is easier to apply and is a trifle lighter.

If the ship is covered with sheet-wood, you'll probably want to color it. A good

(Continued on page 38)


PLAN
A.
JUNKER'S WING SECTION
THE FUSELAGE CROSS SECTION IS RECTANGULAR AND TAPERS TO EMPENNAGE EQUALLY ABOUT THRUST LINE IN SIMILAR RECTANGULAR PROPORTION IN LENGTH
ONE FREEBELLUM MACHINE GUN OR GUN RING AND ONE MACHINE GUN SAME MAKE FIRING THROUGH FLOOR DOWNWARD.
JUNKERS
TWO PLACE CONTOUR FIGHTER
"SCHLACHTFLUGZEUG"
TYPE "CLS"
TYPICAL FUSELAGE SECTION A-A
FUSELAGE OF ALUMINUM ALLOY SHEETS RIVETED TO STRINGERS AND BULKHEADS IN SEMIMONOCOQUE ARRANGEMENT.
TAIL SURFACES ARE FULL CANTILEVER
25'-10" OVERALL
SIDE
WING STRUCTURE OF 7 TUBULAR SPARS AND WARREN TRUSS CONNECTING MEMBERS WITH ALUMINUM ALLOY CORRUGATED SHEETS RIVETED TO WING STRUCTURE. SHEETS WERE PREFORMED AND ATTACHED IN STRIPS. CAMBER OF MEDIAN LINE IS VARIED USING CONSTANT AIRFOIL THICKNESS RATIO AND A VARIED WING THICKNESS RATIO USING A CONSTANT MEDIAN LINE CAMBER AS SPAN IS INCREASED.
LAMINATED WALNUT PROPELLER. 8'-6" DIAMETER.
REINFORCED DEEP CAMBER CENTER STUB WING
40'-0" SPAN
WING SET AT ZERO INCIDENCE. DIHEDRAL ANGLE IS ADJUSTABLE AT WING ROOTS
LANDING GEAR OF STEEL TUBING WITH RUBBER SHOCK CORD ABSORBERS
FRONT
THIS PLANE WAS THE FIRST SUCCESSFUL LOW WING FULL CANTILEVER ATTACK MONOPLANE EVER EMPLOYED IN MILITARY TACTICS AND WAS POWERED WITH THE 180 H.P. SUPER COMPRESSED MERCEDES MOTOR. THE MILITARY LOAD CONSISTED OF BOMBS AND MACHINE GUN AMMUNITION WITH 2 HOURS FUEL AT FULL THROTTLE. THE GROSS WEIGHT LOADED WAS 1135 KILOGRAMS. MAXIMUM SPEED IS 123 K.P.H. ENTIRE STRUCTURE WAS OF ALUMINUM ALLOY.
0 1 2 3 4 5
1/4" SCALE
W. L. NYE

Aviation Advisory Board

Conducted by
CHARLES HAMPSON GRANT
Chairman of the Board
Formerly of
The Technical Section, Air Service, U.S. Army

BEFORE answering our regular questions, we have something to announce which might be of importance to many budding aeronautical geniuses. A notice has come to us from the Institute of the Aeronautical Sciences, Inc., of 30 Rockefeller Plaza, New York City, that a fund of $10,000 will be provided by Elmer A. Sperry, Jr., Edward G. Sperry and Helen Sperry Lea, brothers and sister of Mr. Lawrence B. Sperry, the pioneer in blind flying and air navigation, who was drowned in an attempted flight across the English Channel on December 13th, 1923. This award will be given in memory of Mr. Sperry for outstanding achievements in aeronautics by young men. The fund will be administered by the Institute, which will give a certificate and $250 cash to a young man, who, in the opinion of the Award Committee, has made "the greatest contribution to the advancement of aeronautics during the year for which the award is presented." Members of the Committee to select the recipient for 1936 are: Grove Loening, Glenn L. Martin, Charles L. Lawrence, Major James H. Doolittle, Elmer A. Sperry, Jr., and Major Lester D. Gardner.

This announcement may open many opportunities for young men who are geniuses in the art of aviation.

Now we have some questions which will be of interest to many readers. Victor Chartener of 414 Parkway, Monessen, Pa., who is a National Aeronautic Association member, wants to know the following:

Question: What force lines are used to represent vectorally the loss of force due to the fact that twin pusher propellers push at an angle to the line of flight and not directly parallel to the line of flight? How do you find the difference in the resultant of the forces supplied by the propellers pushing straight ahead and the propellers pushing at angles to each other?

Answer: In any twin pusher as described above, the thrust of the propellers is proportional to the length of the longerons, while the thrust forward parallel to the line of flight is proportional to the length of the frame, measured from the tip at the front perpendicularly to a line connecting the two rear ends of the diagonal frame sticks or longerons.

If the normal thrust of one propeller parallel to its axis is multiplied by the cosine of half the angle between the longerons, the product will be the component thrust force which is exerted parallel to the line of flight by one propeller.

Question: How is longitudinal stability obtained in all-balsa gliders when both the wing and the tail are set at zero angle of incidence, or at the same angle? I have had trouble in hand-launching them. They will stall while traveling upward at high speed, then dive without a normal recovery.

Answer: If such is the case, it is quite possible that the stabilizer is set not at zero but slightly positive to the wing chord, or that the body of the glider is not heavy enough. The stability in such gliders is obtained from two sources; one is that the center of gravity is below the line of resistance. This makes a couple which noses the glider up under speed and gives the same effect as a negative stabilizer. If the wings of the glider are very heavy and the body is light, the center of gravity may be at or above the line of resistance. In such a case, the glider would act as you have described in your question.

Another factor which contributes to longitudinal stability in cases of this nature is the fact that the wings of the glider are set with considerable dihedral. Thus when the model stalls, the wings become proportionally less effective than the stabilizer because the air spills out of the wing tips, due to the dihedral, while under the stabilizer the air creates considerable supporting force.

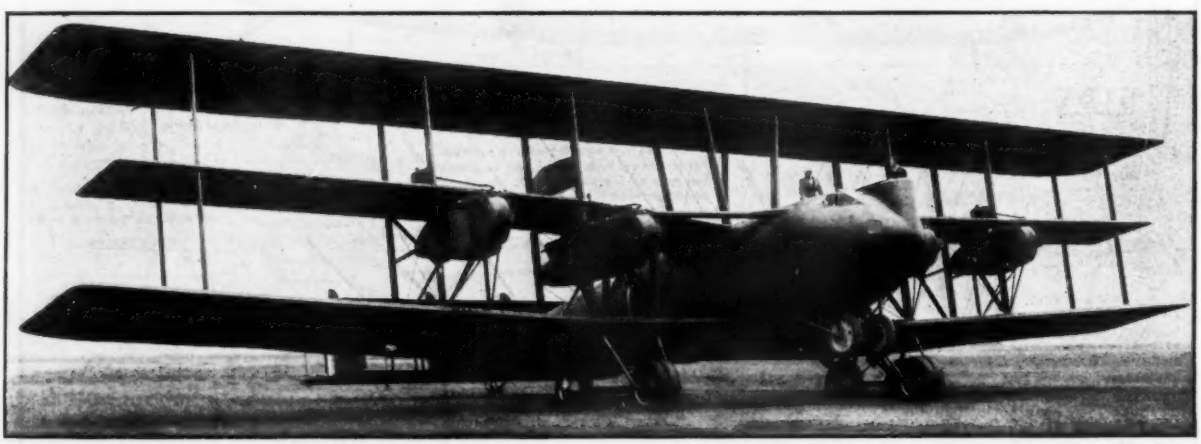
Mr. Chartener says: "By incorporating a negative angle of incidence in the stabilizer, the performance of the glider was improved from a stability standpoint, but it did not reach the height that it obtained before the change was made."

This is a natural result of such a change. In such gliders the stability effect should be obtained as mentioned above by a high line of thrust and a low center of gravity.

Question: What is "Reynold's Number" and how is it used in scale conversion?

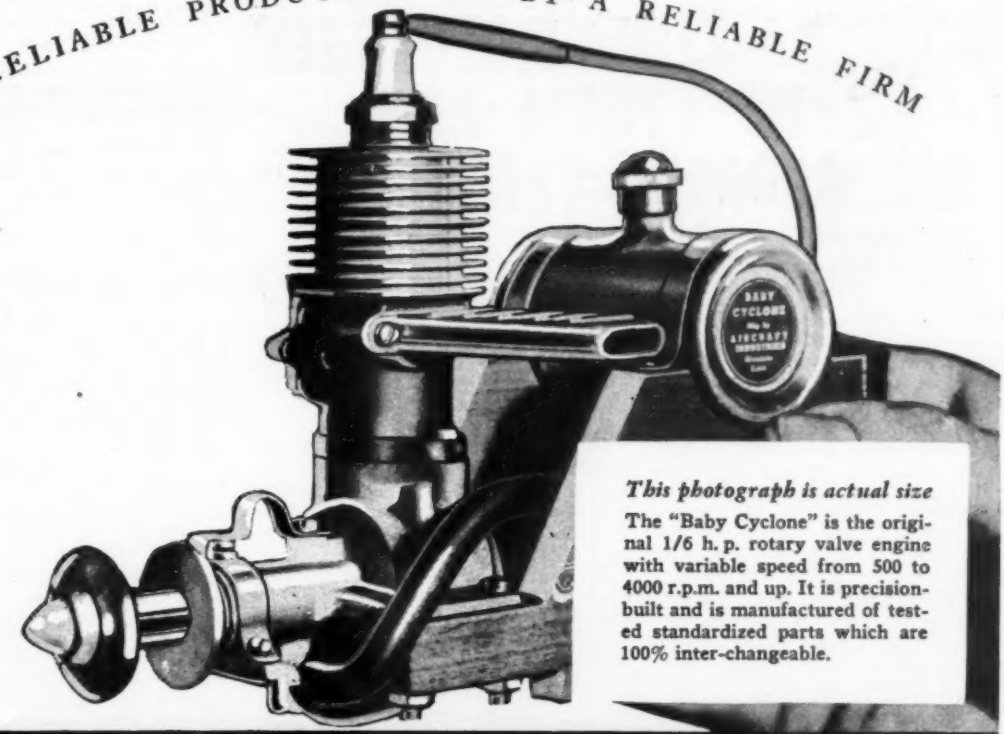
Answer: The explanation of this number and how it is used is rather involved

(Continued on page 47)



The Barling Night Long Range Bomber, N.B.L. 1, which was the largest plane ever constructed in the U.S., having a span of 120 ft. and weighing 40,000 pounds. It was powered with six 400 h.p. Liberty engines, built at the Witteman Aircraft Corp. factory, Teterboro, N.J., and was first flown at Wright Field, Dayton, Ohio, in 1923.

A RELIABLE PRODUCT MADE BY A RELIABLE FIRM



This photograph is actual size

The "Baby Cyclone" is the original 1/6 h. p. rotary valve engine with variable speed from 500 to 4000 r.p.m. and up. It is precision-built and is manufactured of tested standardized parts which are 100% inter-changeable.

BABY CYCLONE *Engines*

Positively Guaranteed

Immediate Delivery

YOUR ORDER WILL BE SHIPPED THE DAY IT IS RECEIVED

Everything you buy must fulfill three requirements to give you full value for your money. The manufacturer must be a reliable organization that is in business to stay. The product must be made correctly so that you will be completely satisfied with it. And whatever happens, the manufacturer must be able to stand behind his guarantee, and replacement parts must always be available.

When you order your Baby Cyclone Engine you know you are getting standard merchandise that more than meets these requirements.

The Baby Cyclone Engine is the original rotary valve production engine which our engineers spent two years developing. All the "bugs" were taken out before one engine was offered for sale. This is the genuine article—not a copy of some other engine which you would be paying good money to experiment with. Remember that thousands of Baby Cyclone Engines have been sold and the satisfaction they are giving users is the best proof of the sound engineering built into these spectacular power plants.

In addition, because of our big scale production and large buying power we actually build far better materials into the engine, yet are able to sell it for less. And this big production assures you of uniform quality and lasting satisfaction.

But on top of all this, every Baby Cyclone Engine is unconditionally guaranteed to give you satisfaction. Aircraft Industries is an old reliable aircraft organization and one of the largest of its kind in the world. It is in business to stay and you will always be able to get service on your engine.

Buy this engine today with full confidence in the organization and in the product. Your order will be shipped the day it is received.

AIRCRAFT INDUSTRIES
MAJOR C. C. MOSELEY, Pres.
Grand Central Air Terminal, Glendale, Calif.

AIRCRAFT INDUSTRIES, Grand Central Air Terminal, Glendale, Los Angeles, California.
I enclose P.O. money order for which please send me prepaid

- ☐ One "Baby Cyclone" engine at $15.75
- ☐ One "California Chief" kit at $7.90
- ☐ One 13 inch highly polished mahogany propeller specially engineered for the "Baby Cyclone" engine, $1.50
- ☐ One each engine, kit and propeller, $25.15

Name.....
Address.....
City and State..... N.

Navi-Goid

(Continued from page 9)

1:20 P.M.

Altitude 7.5
Airspeed 165 m.p.h.
Magnetic Course 235°
Variation 6°E

Hours Flown (?)
True Course (?)
Miles Flown (?)

3:55 A.M.

Emergency Landing—?

OUT of the air, it came. Invisible. Intangible. And yet it was there. It lanced shoreward from the sea with the directness and speed of lightning. However, unlike lightning, it could not be seen.

It was a voice.

The rising and falling murmur of conversation in the pressroom of the municipal airport administration building at Alameda ceased. The stumbling chatter of typewriter keys paused. Through the loud-speaker, the voice came . . . and pencils, in the hands of the reporters, scribbled in mad haste.

In the tower room, Chief Radio Operator Frank Marshall crouched at the instrument panel. Earphones were clamped on his bare head. His fingers were spinning the delicate volume control.

"Pacific Clipper calling Alameda. . . . Pacific Clipper calling Alameda. . . ."

On the second floor, in the Government room, Captain Charles Landon and Lieutenant Harold Sherman straightened from their positions at the chart table. Their eyes rose to the loud-speaker installed high on the wall.

Chief Operator Marshall threw on his powerful transmitter. *"Alameda standing by . . . go ahead Pacific Clipper."*

In the following moment of silence, Operator Marshall's fingers found their base keys on the typewriter. In the Government room, Lieutenant Sherman hastily drew a bound log before him and checked his ink supply.

"Groundspeed 130. . . . Altitude 7.0. . . . Compass course 235°. . . . Drift 2° North. Ceiling 5.0, cumulus strata . . . barometric pressure medium . . . general conditions favorable."

"Pacific Clipper . . . splendid . . . you may expect a strong headwind within the next few hours . . . the Honolulu observatory reported the velocity at 24 m.p.h. The Commanding Officer requests the First Engineer's report regarding the new coils."

"Hold it."

Minutes of patient silence passed. Then the Pacific Clipper came in again.

"The First Engineer reports the coil performance satisfactory to all expected results. That's all."

In the government room, Captain Landon checked the clock. It read 5:45 P.M. The chart variation was 6° Easterly.

. . . . . .

The orchestra in room "C" of station WADK, Los Angeles, completed the fox-trot, and paused. The announcer returned to the microphone, glancing hastily over the sheet of paper that had just been handed him by the studio page.

He signaled and the drummer struck his cymbal disk. The metallic clang was still ringing as the announcer began: "News flash! A wireless has just been received from the Pacific Clipper, which took off at 3:45 Pacific Standard Time from Alameda. The wireless informed the base that the weather was favorable. It also said that the Clipper was making 130 miles per hour. For further details, read your daily newspaper. . . ."

The orchestra raised its soft voice into a dreamy waltz.

. . . . . .

"Pacific Clipper calling Alameda. . . . Pacific Clipper calling Alameda."

"Alameda standing by . . . go ahead Pacific Clipper."

"Wind changing to dead ahead. Altitude 6.0. . . . Airspeed 150 m.p.h. Headwind consistent with report from Honolulu observatory. . . . Compass Course 233°."

Lieutenant Sherman entered the time in his auxiliary log. 7:15 P.M.

. . . . . .

"At the sound of the gong, it will be exactly thirty seconds past seven-thirty." The announcer struck his chimes. "Thirty seconds past seven-thirty. And now we have Stanley C. Howland, news commentator, who will give you the personalities behind the news. Mr. Howland."

"Thank you, Jimmy. Good evening, ladies and gentlemen. To-night we are all eagerly watching that silvery beauty of the skies, the Pacific Clipper, blaze a sky trail to Hawaii. It's truly an epic flight, friends . . . a flight of even greater importance than is now generally believed. And it's a boom to the business man who must make hurried trips to the Orient. If the Clipper maintains its present speed, a man could cross to the Philippines and return in less time than it formerly required for a one way trip.

"A super-crew of distinguished fliers have been chosen for this great flight. Captain Arthur Roderick is commanding the Clipper. He is the one, you will remember, who blazed the Panama air-trail to the Keyes, and linked the Cuba's within scant hours of the continent. Robert Morgan is First Officer. Grant Smith is Second Officer. John Greening is First Engineer. Howard Stevens is Navigation Officer. And George Wallace is the Communications Operator. Each is a veteran of transpacific aerial flights, and, combined, they form a brilliant crew for such an expedition.

"Transpacific flights have long ago been proven practical for military maneuvers, but this is the first attempt to commercialize those airplanes. However, no passengers were carried on the initial trip, although about fourteen will board at Honolulu for the final spans of the flight.

"It is interesting to note that of the 17,000 pounds of weight carried, the bulk was the cargo of mail. There was over 100,000 transoceanic letters. The stamp collectors were certainly alert. Extra crews of postal clerks were necessary to handle the enormous . . ."

. . . . . .

"Alameda calling Pacific Clipper . . . Alameda calling Pacific Clipper."

"Pacific Clipper standing by."

"Pearl Harbor observatory reports weather favorable . . . wind has receded to a mild breeze . . . ceiling at five thousand. Please have Captain Roderick come to the microphone. Major Andrews wishes to speak to him."

. . . . . .

Captain Landon turned the volume lower. "At least, they will have no storms to contend with," he commented to Lieutenant Sherman. "If this headwind fades away, they can hit two miles a minute. At that speed, they can reach Hawaii in less than twenty hours."

Sherman nodded. "From Pearl Harbor to Midway Island is about thirteen hundred miles. That will take about ten hours. Their time from Midway Island to Guam and the Philippines would necessitate twenty-six hours. That makes their complete flight time only fifty-six to sixty hours. Not bad."

NOW IN PREPARATION

1936 CENSUS of

MODEL AIRPLANE { **MANUFACTURERS** / **DEALERS** / **JOBBERS** / **CLUBS**

WE NEED YOUR HELP: Of course it would be impossible to compile the census unless you co-operate with us. Therefore if you fall under one of these four classifications please write us at once on your firm, (or club), letterhead giving the following information:

Classification
Full name of firm, (or club)
Officers
Date established
Address

The industry needs an accurate, up-to-date census and YOU will derive many benefits by cooperating with us. Our 1935 census contained over 350 names, however we expect this year's to more than double that number. You will be notified when the census is available. Send your classification in today to:

MODEL AIRPLANE NEWS
Census Bureau
551 Fifth Avenue, New York City

. . . . . .

At 10:30 P.M., the Clipper again called its base. *"Headwind lull,"* it reported, *"Velocity not more than 4 m.p.h. Airspeed 170 . . . Altitude 7.0 . . . Compass reading 233° . . . Making excellent progress and expect to sight Pearl Harbor before schedule. Have sighted the S.S. Pacific Seas and the S.S. Orlando enroute."*

Operator Marshall rested his agile fingers and the typewriter keys paused in their rhythmic clattering. *"Great,"* he radioed in reply, *"That's really flying. Tell Hamlin . . ."* Fingers plucked at his elbow, *" . . . that Churchill wants to know how that auxiliary adjuster is working on the carburetor of number two."* He turned and found a reporter at his side.

"Say," he growled, "All you newspapermen were supposed to stay in the press room! You've got a dual amplifier there."

"Sure. Sure," the reporter agreed hurriedly, "But ask your pal out there some more questions that will interest the public."

"Such as . . .?" Marshall inquired.

"Ask him if the crew is nervous! See what they think about daily transpacific flights. Ask . . . "

. . . . . .

"Ladies and Gentlemen, Station WADK has another news bulletin concerning the Pacific Clipper. Alameda received a wireless at 11:40 P.M. Pacific Standard Time, that the Clipper has encountered a stiff drift wind. The wireless gave the drift as 8° South. The other readings given were: Groundspeed 140 . . . Altitude at 7.5 . . . and the compass course at 234°. For further details, read your daily newspaper."

. . . . . .

Charles K. Ardsley, President of Southern Airlines, Inc., faced the board of trustee at the conference table. It was a tense group that listened to his words. Men who had played heavily on a gamble . . . who were anxiously awaiting the result.

"If the flight succeeds," he was saying, "we will be assured of the mail contract. As for passengers, we can accommodate twelve. The income from twelve passengers should take care of the fuel expenses. The mail contract—."

He halted abruptly and rose from his chair. The seven trustees watched as he crossed to the radio and increased the volume.

"At 1:20 A.M. P.S.T., word was received that the Pacific Clipper was nearing the Hawaiian Islands. The exact message was: Altitude 7.5 . . . Airspeed 165 . . . and compass course at 235°. The drift wind, the message said, had abated, and that there was little movement of air at the seven thousand level. We will now return to Ray Howard's dance orchestra at the Palm Grove . . ."

The President lowered the volume. "They're doing well," he murmured. "Splendid crew."

. . . . . .

"It can't be, I tell you. An embargo would cause an instant reaction—."

"Hey, Scotty!"

The speaker glanced over, pausing in his moment's criticism. "What's up?" he inquired, frowning.

"Answer that phone of yours. I'm tired of listening to it ring."

Scotty snorted. "You're tired," he

SCIENTIFIC'S "MISS AMERICA" GAS MODEL WINS INSTANT APPROVAL

7 Ft. Wingspan ★ Weight 4½ Lbs. ★ 22 Minutes On 1 Oz. ★ 18 to 1 Glide

★ "MISS AMERICA" clicks instantly! The response has far exceeded our expectations. We have been swamped with orders. Each mail brings more orders from new "MISS AMERICA" buyers. Without delay, out go the kits on the same day to provide greater excitement and thrills than one ever dreamed of. And what's more, you need buy nothing else (except the motor, of course) to complete the model.

★ For outstanding value, here is a gas model that has everything, offered at a price far less than any other on the market. For design, construction and performance, "MISS AMERICA" takes first place everywhere.

★ Among other features of the "Miss America" model are balance tabs on rudder and stabilizer for correct adjustments of flights, and new type battery box which is very light and located in fuselage where batteries may be changed easily.

★ The model is beautifully colored, wings being doped a brilliant red and fuselage blue with black and white trim. It is built to accommodate either the Brown or Cyclone engines (or any reliable motor now on the market) simply by adding or taking out spacers of motor mounts in fuselage. Motors can be mounted into plane in 3 minutes.

★ On test flights the "Miss America" Gas Model has shown a consistent gliding angle of more than 16 to 1 and has kept aloft for over 22 minutes on 1 oz. of fuel.

★ Here's What You Get:—

1 PAIR PNEUMATIC RUBBER WHEELS. Two giant full-size detailed plans giving every bit of information needed for building and flying the plane; streamline tail wheel; large amounts of special wood cement, bamboo paper cement, red and blue dopes; complete printed-out wood containing ribs, bulkheads, wing tips, etc., all strip wood of the finest quality accurately cut to size; special covering material; celluloid; rubber; semi-finished propeller blank; complete set of hardware such as terminals, knife switch, nuts, bolts, machine and wood screws, heavy landing gear wire, landing gear brackets, brass grommets, alum. angles for motor mount, sheet aluminum, battery wire, washers, etc; 1/32" 3-ply birch for covering front of model; strip spruce for parts needing added strength; complete assortment of numerals, lettering, and "Miss America" insignia printed in red and blue on gummed paper; also many more parts too numerous to mention.

Complete Kit (Less Motor) Nothing else to buy! **$7.50** Postpaid or at Your dealer

SHOCK PROOF LANDING GEAR
This landing gear is built on same principle as those used in the real planes of today. Rear wire of landing gear enters fuselage, continuing across and out on opposite side of model. Landing gear wire is strapped to spruce beam in fuselage with rubber bands. When model lands the rubber band is stretched, taking up shock, and then returning to normal position. All parts included in kit.

LANDING GEAR BRACKETS
This is the very latest gas model feature and is exclusive with the "Miss America" gas model kit. Eliminates all soldering, welding, or binding of gear. All you do is insert wire landing gear in holes of brackets and tighten the set screws. It allows for adjustment of landing gear in any position or angle desired. Complete set of two brackets with set screws included in kit.

Now Ready! Send 3c stamp for Catalog listing hundreds of Gas Model Supplies

★ **SCIENTIFIC MODEL AIRPLANE CO.,** 218-220 M-S Market St. NEWARK, N. J. ★

In England: H. & S. Norman, 46 Derby Rd., Kirkhams, Prestwich, Lancs.
In Australia: Swift Model Aircraft, 156 Adelaide St., Brisbane, Queensland.
In South Africa: Stratosphere Model Aircraft Supplies, P. O. Box 3248, Johannesburg.
In France: E. Kruger & Co., 9 Rue St., Sebastien, Paris.

WHITFIELD'S
JAPANESE TISSUE
Brilliant
THIN AND STRONG
AA In 32 Colors AA

BAM-BOO
JAP-FIBRE paper superior to silk for GASOLINE POWERED MODELS. Weight and strength properly proportioned. Natural shade.

WHITFIELD'S IS THE BEST!
Reference from England:—
May we congratulate you on the excellent quality of the tissue which you supplied. It certainly insures perfect covering with the minimum of dope.

No Charge for Cutting Paper

Trade Mark Reg. Applied for
JAP PROPS
ACCURATE
WELL MADE
PROPELLER SHAFTS
THE LATEST JAPANESE IMPORT

These new shafts will enable you to get the greatest power out of your rubber motor. Eliminates friction, and insures longer and faster flights. Accurately machined down so that all moving parts operate smoothly.
The shafts come in four sizes to be used on propellers ranging from 5" to 20". WRITE FOR PRICES.
Our close connection with Japanese makers of propellers eliminates fancy prices and makes it possible for dealers to equip their models with Paul-O-Wina props. We carefully watch quality and only import props that we have found practical.
Reference from California:— We are much pleased with your service and your propellers, . . . and made any prop but yours hard to sell, which not only shows us a fair profit but helps the sale of other items.

MINIATURE
CELLULOID MOTORS
3 sizes: 1½ in.; 2 in.; 2½ in.; 3 in.
Another Japanese Import

Lightweight—a distinct improvement. Perfection in minute detail—priced specially low.
DEALERS and MANUFACTURERS
Very Liberal Discount on Quantities. Send for Sample Motor or propeller with prices 10c

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12 VESTRY ST. NEW YORK CITY
Established 1869

sighed. "How about me." He snatched up the instrument and barked hello. "Yeah, sure," he continued, "I heard you. You've been ringing every five minutes since the Clipper hopped off. I'll let you know when anything breaks . . . Oh, yeah! A fire! That's right down my alley. Splendid. Sure, I want to go. This Clipper assignment is worse than covering a jury decision."

He hung up. "Toots sweet," he sang out flippantly as he straightened his tie and brushed the wrinkles from his suit.

"See you later," he drawled, in parting, and slammed the door. The remaining newsmen grunted in disgust, and settled patiently, and as comfortably as possible, in their chairs, on the desks and even on blankets on the floors. The pressroom subsided into weary silence.

There was a harsh grating in the dual amplifiers. Then the call broke through.

"Pacific Clipper calling Alameda . . . Pacific Clipper calling Alameda."

"Alameda standing by . . . Why the excitement? Something wrong?"

The reporters sat up quickly. They stared at each other in amazement.

"Stay with us. Number four motor is burning. The crew is fighting the flames but I am not sure of the result. Stay with us."

"Alameda standing by."

The reporters were at their phones, talking with a rapidity born of necessity. A frantic fever was prevalent. Gone was the languor that had characterized the newsmen. Now they revealed their training for instantaneous action.

. . . . . .

The announcer violated the privacy of the broadcasting studio and signaled for silence. The orchestra halted in the middle of a melody.

"News flash. Word has been received that the Pacific Clipper is afire high above the ocean. The extent of damage caused by the fire, which was started by a short circuit, is not known. For further details, read your daily newspapers."

. . . . . .

In the government room, in the Alameda Tower, Captain Landon grabbed up the phone and hastily dialed a number.

"Get me Brigadier-General Coddington," he said. "Yes, please hurry." His eyes leaped to the clock as he waited. 3:55 P.M.

"General Coddington? This is Captain Landon at Alameda. Have you heard the news flash concerning the Clipper? No? The first call we received at three-fifty said that number four motor was aflame. They don't seem to be making much headway. The second call blamed a short circuit . . . just a moment, sir!" He listened as the amplifier spoke again.

"Alameda . . . Number four fuel line exploded . . . the flames are spreading . . . Captain Roderick has given orders for an emergency landing. Stand by!"

Landon caught up the phone. "The third call just arrived, sir. Their fuel line exploded and the flames are spreading. Captain Roderick just gave the order for an emergency landing."

He hung up. "Sherman," he cried, "find their position. I'll be up in the tower If they need help, give me their position and I'll call Ford Island."

"WILKIN'S LINE S. S. WINSTON . . . PROCEED AT ONCE TO AID OF PACIFIC CLIPPER . . . C. ARDSLEY . . . SOUTHERN AIRLINES."

. . . . . .

"Telephone, Mr. Ardsley."

The executive of the Southern Airlines lifted the phone to his ear. "Yes?" he questioned.

"This is the Miami Courier, Mr. Ardsley. We just received word of the Pacific Clipper's bad luck. Do you believe it's serious?"

"Why, of course not," the executive replied, "just an accident. They have fire fighting equipment aboard. They'll be on their way soon."

He hung up. "At least," he murmured, to himself, "I hope so."

. . . . . .

"Pacific Clipper to Alameda . . . Flames extinguished but we crushed a section of our hull in landing. Have auxiliary pumps going . . . Leakage severe . . . Please send aid at once."

"Alameda to Pacific Clipper . . . nearest steamships on way to your aid. Hold on."

Captain Landon clutched the operator's arm.

"Raise Ford Island immediately." He telephoned Sherman and penciled the figures on a sheet of paper.

Marshall was ranging his dials.

"Alameda calling Ford Island . . . Alameda calling Ford Island."

They waited in tense silence for the reply from the government station in Pearl Harbor. Precious moments passed. And then it arrived.

"Ford Island standing by . . . Go ahead, Alameda."

Landon leaned close to the microphone. *"Captain Landon speaking. Orders from Brigadier-General Coddington. Launch a flight of fully equipped planes at once to aid the Pacific Clipper. Speed is essential. Their position is Latitude 00:00 . . . Latitude 00:00."*

. . . . . .

THERE YOU ARE, CADETS! Plot the course of the *Pacific Clipper* as given and determine the Longitude and Latitude (00.00 . . . degrees and minutes, and North, East, South or West—i.e. 19.52E—) of its

GAS
MODEL BUILDERS' CATALOG FREE
Here's what you're been waiting for . . . a Catalog and Handbook of Accessories for constructing record breaking gas models. Written by champions. Contains gas model hints, photos of champions and their models, success stories of their championship flights. Free—but will appreciate 3c postage for handling.
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Lists kits, parts and accessories at lowest wholesale prices. Every dealer should have a copy of this valuable booklet—Free for the asking.
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emergency landing. Mail your answer with the map to *Navi-Goid* CONTEST JUDGE, MODEL AIRPLANE NEWS, 551 FIFTH AVENUE, NEW YORK CITY.

Navi-Goid Notes—..... ....

(File these notes with your original instructions)

(1) A better and more simple equation for the location of any position is: *Direction* x *Distance*.
Our ten cardinal points would then be grouped as follows:
Direction:
1. Drift.
2. Deviation.
3. Variation.
4. Chart or Map?
5. Magnetic Compass Reading.

Distance:
1. Time.
2. Altitude.
3. Airspeed Indicator Reading.
4. Groundspeed.
5. True Scale of Miles.

(2) In determining *Variation*, remember that the *chart* represents the *true reading*, and that the *Compass* represents the *magnetic reading*.

(3) *True scale of miles.* You must remember that on a *chart*, it is necessary to *change your scale of miles every ten* degrees. So your scale of miles (calculated as explained for, say, latitude 40°-50° must be changed for latitudes 50°-60° or higher, or 30°-40° or lower. Your scale of miles, say, for 40°-50° will hold true for all distances, at any longitude, within these latitudes.

(4) Correction to Article No. 1: 9.30 is given as nine thousand and thirty. Since the altimeter reads only in thousands and in hundreds, the figures should have been 9.3 (nine thousand and three hundred). Likewise, 12.87 should have been 12.8 (twelve thousand and eight hundred).

(5) The compass readings are given in degrees for simplicity. There are 360 degrees on a compass, with the count beginning East of North and circling clockwise. Thus North East is 45°, East would be 90°, South 180°, West, 270° and North 360°.

Following are the lucky contestants who were the winners of Contest No. 1:

Griffith Bedworth, 78 Elmwood Avenue, Waterbury, Conn.

Ronald P. Dawe, Yale, B.C., Canada, Box 14.

Bud Larson, 2515 Clinton Avenue, Minneapolis, Minn.

Reid B. Lyford, Jr., 1306 First Avenue South, Northwood, Iowa.

Manuel Soler Jimenez, 205 W. 1st Street, Miami, Florida.

Frontiers of Aviation

(Continued from page 17)

will be two decks and a captain's bridge (all enclosed, of course). The bridge will be 12 by 15 feet with two seats for pilot and co-pilot and a huge desk 4x6 feet for navigation charts. To the rear of the bridge will be the radio cabin and below decks will be the robot pilot. Mechanical power will be needed, as on a steamship, to control the plane. The pressures exerted on the controls will be too great for the pilot to move with a "stick" without the help of an engine. The plane will carry 40-50 passengers. Under trans-Atlantic conditions about 36 will be carried with fuel for a 4,500 mile range. It will have a 16 x 16 foot dining room, to be used also as a lounge and for dancing.

The crew members may walk through the wing and inspect the engines while the plane is in flight. Mr. Sikorsky figures it would take one of these planes 24 hours to reach any part of Europe, 36 hours to reach Egypt, 2 days to India, and 3 days to China. The highest comfortable altitude at which the plane will fly will be about 27,000 feet. For faster flights, altitudes of from 30,000-35,000 feet may be obtained.

There have been unconfirmed rumors that many other Sikorsky planes have also been designed. It has been stated, unofficially however, that Sikorsky's new bomber will be powered by Allison flat-type engines enclosed in the wing. These, it is said, have been rated at about 1,000-1,200 hp. There have also been rumors of a Sikorsky land biplane transport.

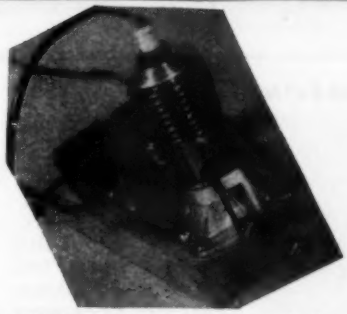
According to one of the National Advisory Committee for Aeronautics, reports recently distributed, 24-ST aluminum is still favored for use in the construction of aircraft in place of stainless steel. It appears that it will be some time before stainless steel will be used to any great extent in aircraft construction. Fleetwings, Inc., have been one of the foremost concerns in developing stainless steel for aircraft use and at this date have made wonderful progress, though it may be some time before we will see many stainless steel airplanes.

Mr. Shelton's popular 4-place Crusader is now being revamped and will have a retractable landing gear. His new seven-place job is now well under way. Already Mr. Shelton has received an order for four of these planes with an option on a fifth one from a mid-western transport line. Performance of the new planes follows:

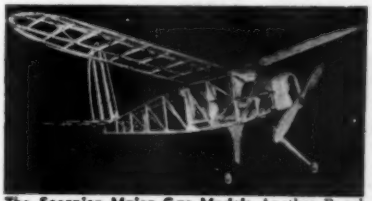
High speed (5,000 ft)—210 m.p.h.
Cruising speed (5,000 ft.)—180 m.p.h.
Climb at sea level—1,000 f.p.m.
Service ceiling—20,000 feet
Cruising range—720 miles
Landing speed—64 m.p.h.
Payload—1,420 pounds
Gross load—6,500 pounds
Wing span—48 ft.

The latest Chance Vought Navy scout-bomber is a low-wing monoplane, the first Chance Vought monoplane since 1917. Eddie Allen, famous test pilot, recently deliv-

DESIGNED, CUSTOM BUILT AND PROVED BY AERONAUTICAL EXPERTS



Specifications: Built from the finest aluminum and steel alloys—accurately heat treated—no die-cast or pot metal parts used. Flying weight, complete with batteries, 18 oz. Height, 4½"; Bore, 13/16"; Stroke, 13/16". Speed Range, 800 to 6500 R.P.M.



The Scorpion Major Gas Model: Another Bunch champion—incorporating advance structural and aerodynamic design. Easy to assemble. Fully tested in hours of flight. Original model still going strong. You'll be proud to own and fly this Scorpion gas-powered model. Detailed drawings cover building and flying instructions.
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ered it to the Navy for tests. The plane has a novel retractable landing gear and is very clean in design. It appears to be of the conventional Chance Vought construction with a combination of metal and fabric covering. The pilot and observer are enclosed in the conventional glass sliding enclosure. Its official designation is the XSB2U-1.

From looking at the make-up of Douglas' new 138-foot, four-engined transport, it seems that the ship will be of the same general design as the Dc-2 and DC-3. The huge airliner will weigh 54,000 pounds and at present the design calls for four 970 hp. engines.

Douglas' new O-46 observation planes have a wingspread of 46 feet and a speed of 203 m.p.h. with a 725-hp. twin-row Wasp.

North American Aviation has completed another new Army trainer with many new features in design over the former ones. At this writing we are not permitted to give you details of the plane, but we will probably be able to do so in our next issue.

From France we hear that those six giant six-engined flying boats similar to Air France's ship which flew the Atlantic only to sink in a Florida bay, are not to be built. Three were to be built for the French government and three for commercial use. Instead a much larger plane has been designed and is now under construction.

It is said that the new English Vega Gull four-place low-wing monoplane does 170 m.p.h. with full load. It is powered by a 200 hp. Gipsy Six engine.

The British Aircraft Manufacturing Company, Ltd., have completed a twin-engined six-place, gull-wing monoplane powered by Gipsy Major engines. Wheels retract into the engine nacelles which are underslung from the wing.

Aeroput, foremost Jugoslavian aircraft builders, have built a unique, high-wing monoplane. It is powered by two Pobjoy 90 hp. engines mounted in the leading edge of the wing. The fuselage is very narrow and encloses three people sitting in tandem fashion. The tail is on outriggers extending aft in line with the engines. The ship has a top speed of 146 m.p.h. and cruises at 133 m.p.h. Landing speed is 46 m.p.h and cruising range is three hours.

Build a Scale Model of the England's Fairey Battle

This is one of the most outstanding military planes of the day. Powered with a Rolls-Royce engine, it has a top speed of close to three hundred m.p.h.

Make the entire model of balsa wood, which may be purchased at a model shop or department store. Get dimensions from accompanying plans. If you wish to square-off the plans and make measuring easier, connect the corresponding dots on border with straight pencil lines.

Draw the outline of the side view of the fuselage and cut to shape. Then draw the outline of the top view on the piece and cut again. Shape out the rest of the fuselage with a razor blade, referring to the cross-sections on plans. Go over the fuselage with coarse and then fine sandpaper. The crew enclosure should be made from thin strips of balsa joined together with model cement.

Make the wing in the same manner as you did the fuselage, cutting out first the top view outline and then the front view. Shape out the airfoil with a small sharp chisel as shown by cross-sections. Sandpaper the surfaces thoroughly.

The tail surfaces may be easily cut from sheet balsa with your razor blade and sandpapered to smoothness.

The prop blades may be cut from scrap wood and cemented to the spinner. Cut groove in bottom of fuselage for inserting the wing. Sandpaper all parts once more and then begin the assembly.

Join wing to fuselage first, applying plenty of cement. Be accurate and take your time. When joint has dried, cement the tail units in place. Then lay the model on its back and build up the landing gear. Use small strips of balsa wood for the struts and a piece of wire for the axles. Apply a good amount of cement. The prop may then be joined to the nose, using a straight pin as a shaft.

Sandpaper the model thoroughly. Brush off all dust and apply the dope. Dope the entire ship silver with few exceptions. The outside circle of the insignia should be red, the center one blue, and the other white. The wheels and exhaust should be black. Apply many coats until a smooth finish is obtained. The model will then be completed.

Do your work carefully and you will have a plane to be proud of.

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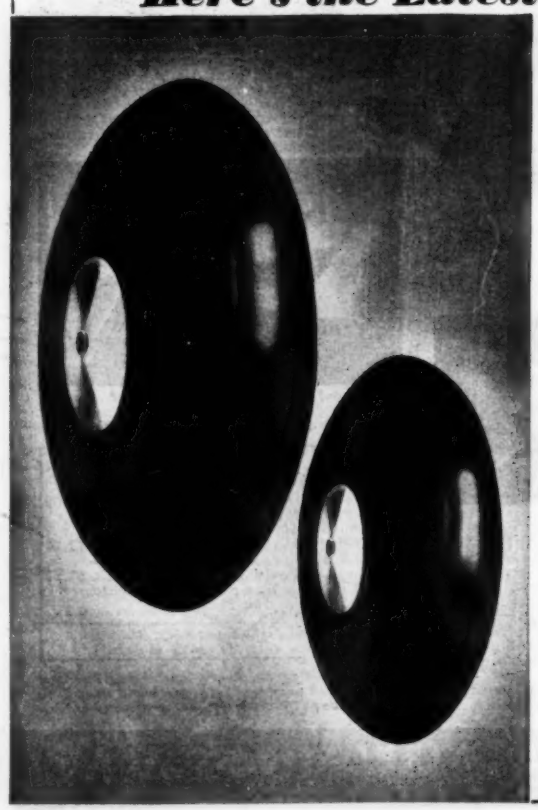

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Shaping Your Model for Efficiency

(Continued from page 19)

shown how "raking" or curving the wing tips reduced the resistance and increased lift per unit of area of the wings.

There are several shapes that you may give to the wing tips, all of which will increase the wing efficiency. Each corner may be rounded or the whole tip may take the form of a semi-circle. However, the best form, proven by practical tests, is the parabolic or egg-shaped wing tip. In the plan of the model which we have been designing, the tips of the wings have been given this parabolic form. Thus the parts of the wing which give little lift but considerable resistance have been cut away, producing a wing that has little "end spill" and which slides through the air with little resistance.

Tail Surfaces

The same principles may be applied to the tail surfaces. The parabolic form of tips in the case of both the stabilizer and fin enable them to produce the greatest effect for the least amount of surface area involved.

The tips of the stabilizer may have leading and trailing edges which are symmetrical or they may be shaped as shown, the tips being slightly to the rear of its lateral center line. This brings the center of pressure on the stabilizer farther to the rear and has the effect of increasing the length of the stabilizer moment arm, which is a contribution to stability.

The fin has been given the parabolic shape and its tip is slightly to the rear of its center also. Its tip has been made fairly pointed in order to keep the center of lateral area (direction center) as low as possible.

Propeller

Without doubt the part of the plane that causes the greatest perplexity when the problem of shaping it arises, is the propeller. Some builders believe wide blade tips to be the best; others can give you definite reasons why narrow ones are superior. Most model builders are in a quandary as to what to believe. Suppose we look into this problem.

First of all it can be seen that the more nearly parallel the blade surfaces are to the plane of rotation, the greater is the thrust component, compared to the lift force acting perpendicular to the blade. If a propeller has a large blade angle, then the thrust is small compared to the lift force acting perpendicular to the blade. In other words the smaller the blade angle or the lower the pitch is for any given propeller diameter the greater is the amount of power the propeller will deliver compared to the power put into turning the propeller.

This fact is very significant when the efficiency of various parts of the propeller blade from hub to tip is considered. It means that that part of the blade which has the smallest blade angle, is the most efficient part. Considering the propeller, we find that the smallest angle is at the tips of the blades. This part then should be the most effective part if tip loss (or end spill of air) is not considered. Contrary to the understanding of many model builders, there is no end spill on a propeller blade. Instead of the air spilling out of the blade tips, it actually moves in toward the propeller axis. This is shown by the fact that the air stream (slipstream) from a propeller "necks" in as it passes rearward from the propeller. So all the theories of tapering the blade tips to prevent tip loss go up in smoke. Such theories like smoke, have hidden the road to truth, for practical tests have definitely proved that greatest efficiency results when the center of area of the blade of a propeller is located well toward the tip of the blade. This means that the area of the blade close to the propeller hub should be cut away and as much area as possible should be left at the blade tip. The blade area is then located where it will give the best results for the amount of power applied.

However, sharp corners give considerable resistance when they are passed through the air. Therefore, it is advisable to round the corners of the blade tips slightly in order that the air will flow around them without turbulence. A semi-circular blade tip will give excellent results.

The blade tip rounded as shown in the plan on page 19 will give fine results. It represents an average design. The tips are neither very narrow nor very wide and stubby. However, they may be rounded even less than is shown which would probably result in a slight increase in efficiency.

In order to reduce the ineffective area of the propeller, it should be cut away at the hub as shown in the side view of the plans. The hub section should be cut away to about 33% of its original depth. This means that if the propeller is ¾ in. thick at the hub, it should be cut away so the hub is only ½ in. thick. This cut should taper down to zero at a point one-half the distance out from the hub toward the blade tips.

Frame Parts

The only other means that can be taken to reduce the resistance of the plane in flight is to streamline the landing gear struts, the wheels and the stick acting as the fuselage.

Wire struts are used in the landing gear in this model so any added streamlining would probably cause a more disturbed air flow around them because of added diameter and irregularities in workmanship.

The wheels may be streamlined by making the rims thin, leaving the hub section thick.

If you wish to go to extremes, the stick may be made with a cross section similar in outline to the form shown in Fig. No. 114. In this model, rounding

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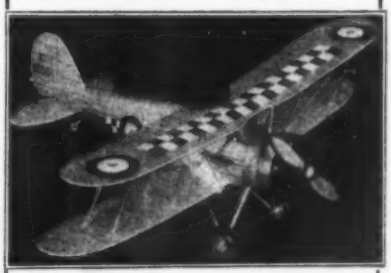

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the edges of the stick slightly will be sufficient, for the advantage of a tear drop or streamline section stick is very slight.

Your stability model is now completely designed from an aerodynamic standpoint. The problem that faces the model builder at this juncture is to design the internal structure of the model so that the *exterior form* dictated by aerodynamic consideration, is retained. This is beyond the province of these articles. However, the following suggestions are made for the benefit of those who wish to construct the model, the plans of which are shown at the bottom of page 19.

1. The wing may be made with a single or double surface airfoil. If a single surface wing is employed, make it of sheet balsa 1/32 to 3/64 inches thick. Cement three ribs to the underside of each wing half: one near the center, one about 28% from the center and the third at a point about 60% from the center of the wing.

2. If a double surface wing is to grace your model, make it of orthodox construction: a leading edge, center spar, a trailing edge and ribs two inches apart, all of balsa wood. Cover the built-up frame with Jap tissue paper.

3. Make the propeller of medium hard balsa wood.

4. Make the tail surfaces of 1/32" sheet balsa of light weight. Strips 1/8" wide and 1/32" thick cemented to upper and lower sides of the stabilizer, parallel to the line of flight, will prevent the stabilizer from splitting. A set of these strips should be located on each half of the stabilizer at a point about half-way from the center to the tips. Two strips should be cemented to the fin, one on each side.

5. Select a motor stick of hard balsa 19½" long, 3/16" wide and ¼" deep.

6. The wheels should be of hard wood 1¼" to 1½" in diameter and ¼" thick.

7. A steel bearing and a rear motor hook of 1/32" steel wire, as shown in the plans, will prove satisfactory.

Next month it will be shown how the aerodynamic set-up of forces may be modified to produce a stability fuselage model, for which plans will appear.

Ways and Means of Gas Model Success

(Continued from page 29)

method would be to give it a coat of colored tissue. This not only serves to beautify the model, but also makes the covering tougher.

With regard to the motor-mount—it can be built either all-metal, or, preferably, of a hardwood framework covered with plywood. Should you build the wood type, use Casco glue for the joints, in combination with wire brads. It is not advisable to use model airplane cement, due to the fact that oil soaks under it and ruins the joint. When completed, give the whole motor-mount about three coats of shellac, allowing time for drying between coats.

When building the landing gear, draw full size patterns for the different parts in order to insure accuracy. If you have any wire bending to do, use a vise and mallet, especially if the wire is somewhat thick. If you've ever tried bending .096 music wire with a pair of pliers, you'll realize what a trying job it is. If you have any soldering to do and you have to use acid in the process, be sure to wash away all traces of the acid when you have completed the job, otherwise the parts joined will corrode, and consequently weaken.

Well, that just about covers the building of the ship. Now about that crucial moment, the first test-hop! First, pick out a nice spot for launching your creation into the air. Choose a roomy field that has the minimum of obstructions, and is quite soft. (If it weren't for the fact that it is so hard to retrieve a ship from there, a swamp would be a very good place to test-hop the ship.) Keep away from concrete runways for the first flight at least. A nose-dive into the concrete won't help the ship any. Once you've taught your crate to fly properly, use the above-mentioned runway as often as possible, as it is a distinct aid to beautiful take-offs, but until then, be cautious!

Assemble your ship, making sure it won't come apart in the air. Check the position of the wing relative to the C. G. of the ship, then check the angular settings of both the wing and the stabilizer. Set the rudder at neutral and you're ready to go! Give the engine about two eye-droppers full of fuel, or enough for about 1 minute running, turn the prop over; then, when the engine is turning over right, point the ship into the wind.

If you have to hand-launch the ship,

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heave it hard enough so that it will gain flying speed immediately. Otherwise, it may hit the ground before it can get started. If you have a clear stretch of ground from which the ship can take off by itself, so much the better. In this case, give the model just enough push to get it started on its course. The advantage of having the model take off by itself is that it remains safely on the ground until it has sufficient flying speed, after which it assumes its own angle of climb. When you hand-launch it (or catapult it by pushing it too hard at the take-off), there is a chance that you might stall it—rather a dangerous maneuver at the start of the flight!

Once the ship is in the air, the matter is entirely out of your hands, so relax (if possible) and note its action. If it refuses to gain altitude, you may either move the wing forward slightly (on the next flight, of course,) or raise the trailing edge of the stabilizer a bit. If the ship swoops up, stalls, then dives, then keeps repeating the maneuver, the best bet would be to lower the trailing edge of the stabilizer about a half degree (1/16" for each 4" of stab. chord), especially if you're sure you have the wing set in its proper position. If the ship has a tendency to bank steeply, give it a bit of opposite rudder. You may have to move the wing back slightly after doing this, but try it first with the wing set as it was.

Now that you've got her flying right, the next step is to get a car so that you can chase the crate when it starts on one of its cross-country jaunts.

How to Build a Trophy Model

(Continued from page 7)

on the side view (back side of prop) is not cut away until the pitch has been carved. Use a blade section with a camber of about ⅛. For best results, use a free wheeler. Any kind will do but be sure it is reliable and will disengage properly. If free wheeler jams, a poor glide and low time will result.

For power use 16 strands of ⅛ flat rubber. This seems like a lot of power to some of you, but we Indianapolis fellows believe in getting the old "crate" up. Our prop runs are only about 1 minute, but in that minute the crate is up in the thermals. Prop shafts and "S" hooks are made of No. 18 wire and are insulated with ⅛ O.D. rubber tubing.

Now assemble everything and take outside. Before winding, check everything. Balance the model by the wing tips. It should be slightly nose heavy. Move wing back until this condition is right. First try with a few winds. When the right amount of negative thrust is found, give her the gun and start moving because you are going to do some road work. Always remember one thing, after the model is balanced and working satisfactorily, never fly on a hot day unless you pull the nose pin out at the nose. At the end of the prop run the prop and about 3 inches of rubber will fall out making the model nose heavy, thus grounding it.

Well, good luck

Build and Fly This Italian Fighter

(Continued from page 11)

and bend to the correct leg angle. The ends of these wire pieces are bent over and imbedded in the struts. The wire passing down the outside of the struts is bound to them as well as cemented.

The ½" tail wheel is enclosed in a streamlined housing ¼" thick. This housing is cemented to the fuselage in the position shown.

Wings

The spars are 1/16"x⅛" hard balsa. The ribs already cut are, with the exception of the 1/16" innermost ones of each panel, of 1/32" sheet. The leading edges are placed on edge in the rib notches provided. The 3/32" sq. used is half rounded. The trailing edges are 1/16"x3/16". The wing tips are bent to shape from 1/16" sq. bamboo. Dotted lines show the proper substitution of sheet balsa if so desired. Between the first two ribs of each wing panel are inserted pieces of 1/16"x¼" to prevent the buckling of the rib under the covering and to provide a firm wing mounting. Note that the first rib of each panel is also slanted 1/16" to provide for dihedral.

Cover each surface of all panels with separate pieces of tissue. A very light, even spraying, is sufficient to make the paper taut. Apply the dope lightly also.

Cement each panel to the fillet rib using pins to hold the work in position. Cut the interplane struts to size as shown on the side view, streamline and sand, and cement in position on the designated ribs. Black thread is used for the wiring as shown in detail.

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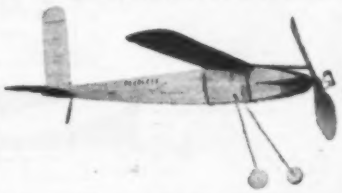

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Propeller, Cowling and Motor

The cowling face is glued up from four ¼" balsa discs. When dry the center is cut out as shown on the side view. A jig or coping saw will facilitate the work. The final contour is achieved by the use of a sharp blade. The rear of the cowling is a ⅛" balsa disc. Eight spacers are cut from 1/16" sheet and cemented in position between the front and rear cowling face pieces. The outer shell is bent to shape from 1/32" sheet balsa. When completed, sand the surface of the cowl to a smooth finish.

As seen on the side view and in the detail M, the two row dummy motor is to be supported, since it is detachable, by a ⅛" sheet balsa box. This box when finished is passed through the front cowling opening to its position on the inside.

As shown by the dummy motor detail, the crankcase is glued up of two similar pieces each of which is to support seven cylinders. The front piece however is of a thickness that will enable the rounding of the case as seen on the detail and the side view. The bearing is of tin also patterned on the plan. The cylinders are built up of alternate layers of large and small stiff paper discs. The square plug at the rear of the unit is a piece of ¼" sheet.

The three-bladed propeller is glued up before carving. Each blank blade is ⅝" thick and 1¾" wide. The tips are not rounded until the blades are finished. Balsa triangles are used to reinforce the hub as detailed.

To balance, place two blades opposite and lighten the one descending. Turn the prop until the third blade is opposite one of the two balanced ones and repeat. It will be necessary to repeat this procedure a number of times in order that a fair balance will be attained.

Bend the front end of the shaft and passing it through the prop, imbed the hooked part in the hub face. Place a tin bearing, similar to the one already used in the dummy motor, in the rear face of the prop hub. Slide a friction washer and the dummy motor on the shaft and bend the rubber hook.

The motive power is at least eight strands of 1/16"x⅛" rubber.

Flying the Model

Test your model over deep grass if possible. If none is available fly the ship R.O.G. on a few turns. If necessary use a small lead weight to balance. As the balance is ascertained, increase the turns to capacity.

In flying the original, it was noticed that model flew rather fast. It is pleasing to know however, that the glide was flat. The little Caproni is remarkably stable and is rugged enough to provide ample flight repayment for your work.

Bill of Materials

8—1/16" sq. x 36" strip balsa
2—1/16" x 3/16" x 36" strip balsa
3—1/16" x ⅛" x 36" strip balsa
1—3/32" sq. x 24" strip balsa
1—⅛" x ⅜" x 12" strip balsa
2—1/16" x 3" x 24" sheet balsa
1—1/32" x 3" x 24" sheet balsa
1—¼" x 3" x 36" sheet balsa
1—⅛" x 3" x 12" sheet balsa
1—¾" x 2" x8" block balsa
1—½" x 1¾" x 8" block balsa
1—1⅜" sq. x ½" block balsa
1—1⅜" sq. x 1⅛" block balsa
1—2⅛" x ⅜" x 2" block balsa
3—4½" x ⅝" x 1¾" block balsa
2—1¼" x ⅝" x ½" block balsa
2—sheets tissue
1—oz. cement
2—oz. dope
2—ft. .028 music wire
1—pr. 1¾" wheels
1—½" wheel
8 ft. ⅛" flat rubber
3—1/16" x ¼" bamboo
cellophane.

U. S. Navy Fighters—Past and Present

(Continued from page 5)

The F4B-3 was the first type to use the now popular semi-monocoque all-metal fuselage in place of a structure of tubing and fabric. Performance was considerably boosted with this advance in design and top speed of the F4B-3 and F4B-4 was over 190 miles per hour. The F4B-4 differed from the B-3 only in having a 550 Wasp, strengthened wings, larger headrest and more vertical fin area. Boeing's first monoplane fighter, the XF5B-1, was a private enterprise on this company's part and was never produced for service. It was essentially an F4B-3 type all-metal fuselage with a metal, strut-braced, parasol wing and having the usual corrugated dural controls. Soon after another experimental type was produced, this time a biplane with a Twin Wasp Jr. engine of 650 horsepower in the nose. Wings were of equal span and mounted ailerons on the lower panels only. A cantilever single strut landing gear was another feature. It received the designation XBFB-1 (bomber-fighter) soon after but after testing was found inferior to other types. The last Boeing fighter to appear is the lowing XF7B-1 of all-metal construction throughout. A 550 horsepower Wasp engine drives this tiny ship at an estimated speed of 250 miles an hour. A retractable landing gear, tapered cantilever wings, and trimming tabs on the elevators are still more of its new features.

A Bristol "Bulldog" fighter, constructed in England for our Naval service, was totally wrecked and the test pilot killed when the ship dove headlong into the ground. The cause of the crash has never been fully ascertained. This ship was purchased mainly to test British methods of construction and for comparison with American single-seaters.

Curtiss "Hawk" fighters have gained fame in our Naval service and have seen much use aboard the various aircraft carriers. Other types such as "Helldivers," "Sparrow-Hawks," "Goshawks," etc., have also seen service. The first true fighter to be built by Curtiss was the F4C-1 biplane, an all-metal, fabric-covered version of then popular Curtiss "TS" type. The next famous Curtiss was the F6C-1, a modification for Naval use of the Army's P-1 Pursuit. This ship, like all following "Hawks," had tapered wings. The F6C-2 was changed internally to allow for carrier gear installation and could also be quickly changed to twin

float gear. The F6C-3 was still further modified, having a new type axle landing gear designed to take the shock of rough carrier landings. This ship, by the way, marked the retirement of the water-cooled engine from service fighters, all later types using the reliable air-cooled engine. The F6C-4 and F6C-5 were both Wasp-powered ships, being merely old type "Hawks" with the air-cooled Pratt and Whitneys mounted. A specially built "Hawk" was made for the National Air Races in 1930 and was a distinct departure from usual Navy design. Although made primarily as a racing job, it received the designation XF6C-6. It was in this ship that the late Capt. Page was killed when in rounding a pylon at full speed, the ship dove a wing into the ground and completely demolished itself. An inverted air-cooled Ranger engine of 420 horsepower was tested experimentally in the XF6C-7 "Hawk" but was not generally successful. The need for a fighter of better high altitude performance became apparent at this time with the advent of the super-charged radial air-cooled engine and in answer to these demands the XF7C-1 was made. It differed from other "Hawks" in having a swept-back upper wing and straight lower panel and used a 450 horsepower Wasp engine for its motive power. The now famous "Helldiver" was soon after evolved, and known as XF8C-1 was a great advance over previous attempts at a two-seater fighter. It has been developed from its original state in the XF8C-1 to the F8C-7 "Command-Helldiver" and the F8C-4 has been in constant use since its appearance. All models from XF8C-1 through F8C-5 were Wasp-powered but the F8C-6 and F8C-7 both used 575 horsepower Cyclones which gave them considerably better speeds.

The Navy's experimenting with lighter-than-air craft and the subsequent purchasing of the Akron and Macon gave rise to a new specialized branch of fighting planes. The Curtiss "Sparrow-Hawk" was designed expressly for this purpose and was a small, fast, all-metal type of very clean appearance. Both an XF9C-1 and an XF9C-2 were made to test dirigible "hook-on" devices and soon after an order for 6 of the F9C-2 type ships was given. Up until the tragic end of these two ships, the Akron and Macon, the tiny "Sparrow-Hawks" were in almost constant use. No details relative to the F10C-1 have been released by the Navy Department at time of writing. The F11C-1 and F11C-2 were built as modifications of the Army's successful "P-6E" type, and known as "Goshawks," they are in use on our carriers at this time. The XF11C-1 was produced experimentally only and used a Twin Whirlwind engine of 700 horsepower. This type engine was found to be inferior in many respects to the Cyclone 670 used in the XF11C-2 however, and it was this latter type that was produced. Both of these ships were redesignated as "BF" types, the C-1 becoming XBFC-1 and the XF11C-2 becoming XBFC-2.

One XF11C-3 was produced with a fully retractable landing gear which folded into the fuselage sides just aft

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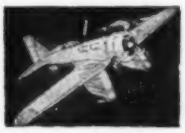

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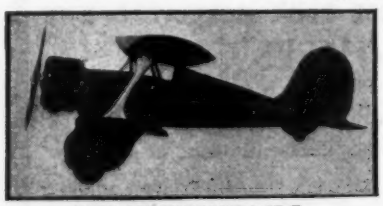

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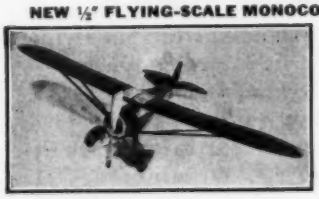

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of the engine. This job, since known as BF2C-1, is in active use aboard the U.S.S. Ranger, at this time being used as standard equipment of the 5th bomber-fighter squadron. The retractable landing gear is said to increase the speed some 20 miles over previous "Hawk" models. Curtiss again made a two-seater in 1934, this time receiving the designation XF12C-1. However, it was later changed into a Scout-Bomber (S-B) type and re-designated as XSBC-1. It was a parasol monoplane of metal construction throughout and used a "Grumman" type retractable landing gear. Slots and flaps were also standard equipment. This job was unfortunately totally wrecked while on a test flight. It is believed that this type of ship shows great promise as a shipboard fighter as the parasol or high-wing monoplane, from the storage angle alone, is ideal for Navy use. Many more ships of this type can be accommodated on the carrier deck or hangar due to the manner in which they can be "sandwiched-in" with tails under wings of other ships, etc. The biplane or low-wing monoplane obviously takes up much more room and thus lessens the effectiveness of the carrier. Another high-wing job has recently been turned out by Curtiss, the XF13C-1. This job is a single-seater of all-metal construction and features a fully enclosed cabin for the pilot. Flaps and slots are again used as well as the Twin Whirlwind engine of 700 horsepower. Top speed is estimated at between 250 and 275 miles per hour and landing speed is said to be extremely slow for a ship of this type. Two later modifications have appeared as well, the XF13C-2 and XF13C-3.

The only fighter constructed by the Douglas Aircraft Company of Santa Monica, California, is the XFD-1 two-seater biplane. This speedy little ship, a development of Bureau design No. 113, was an attempt at the two-seater fighter Naval contracts but was found inferior to others under experiment. A Twin Wasp Jr. engine of 700 horsepower gave this little tapered wing ship a top speed of somewhat over 200 miles per hour.

An Eberhart "Comanche" Fighter FG-1 was this company's only contribution to Navy VF ships. The FG-1 used a Wasp 450 engine and design in many respects closely followed the Curtiss F7C-1. Usual fabric, wood and tubing construction methods were used. Only the one ship was made and never saw active service.

One experimental single-seater with a metal monocoque fuselage was built by Fokker and was designated XFA-1. It was in many respects quite like the Curtiss "Sparrow Hawks," having a "gulled" upper wing, metal fuselage and fabric wings. A wide single strut landing gear was used. A Wasp Jr. engine of 400 horsepower gave this job a top speed of approximately 180 miles per hour. It was never put into production.

Although a comparative newcomer to Naval aviation, the Grumman Aircraft Engineering Corporation has produced a great many of our latest high speed fighters. This company entered Naval fighter aviation with a small two-seater biplane of all-metal structure and using a 670 horsepower Cyclone engine for its power plant. This job, the XFF-1, was found to be an excellent type and many of the FF-1s have been delivered for carrier duty. A smaller fighter soon made its appearance, this time a single-seater, known as XF2F-1, and mounting a 650 horse-power Twin Whirlwind engine. 54 of the F2F-1 types were ordered for use as standard carrier fighters. The production F2F-1s mount Twin Wasp Jr. engines of 650 horsepower in place of the Whirlwind however. Some difficulty in cooling the latter was said to be the cause for this change. A new single-seater has but recently appeared and from reports is even faster than the F2F-1. This new ship, the XF3F-1, is in the main merely a cleaned-up F2F and has many of the earlier ship's features. The Grumman Company has had more than its share of bad luck as in the past year two experimental single-seaters have crashed. The first in which Jim Collins met his death and a second from which Lee Gehlback was forced to bail-out while on a test hop.

An experimental biplane fighter was made in 1929 by the Hall Aluminum Aircraft Company as a try at Navy contracts. This job featured a watertight, all-metal fuselage that would remain afloat almost indefinitely. In addition, the pilot could, by simply pulling a lever, disengage the entire landing gear thus making a safe water landing possible. Another unusual feature was the swept-forward lower wing, a type seldom used. The XFH-1, powered with a Wasp 450, was never put into actual service use.

One of the new crop of fighters is the low-wing Northrop XFT-1. Powered with a 700 horsepower Twin Whirlwind engine, it is of all-metal construction throughout, the fuselage being of full monocoque type and wings of usual Northrop multi-spar design. A cantilever landing gear with full "pants" housing the wheels was first used, but later a semi-retractable type was used in

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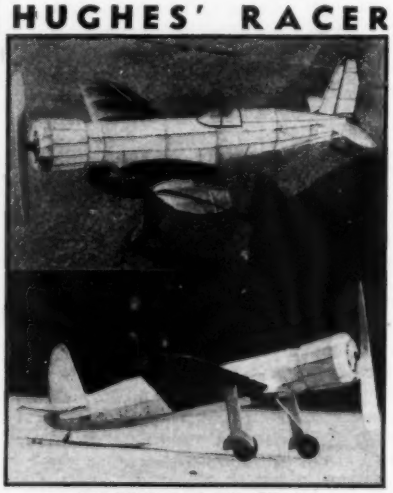

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which the wheels could be pulled into the "pant" itself thus cutting resistance to a minimum.

Vought's first fighter, the FU-1, saw service mainly as a seaplane battleship type. Power used was the 200 horsepower Wright R-790, better known as the Wright "J-5." Construction was entirely of wood, the whole being fabric-covered. A two-seater Vought fighter was produced in 1928 known as the XF2U-1. It differed from ordinary "Corsairs" in having straight wings, not the usual sweptback type common to all later Voughts. A 450 horsepower Wasp engine was neatly cowled in a wide NACA cowling. The XF3U-1 developed in 1933 was a considerable improvement over earlier types and had fully covered cockpits for both pilot and rear gunner, swept back wings, fully cowled engine, and greatly increased speed. Both this job and the XF3U-2, later produced, were developed from Bureau design No. 113.

The Wright Company fighters, although little known, are of interest in that they showed unusual design for their day. Most of them were little more than racing types and saw no actual service as fighters. The F2W-1 was of wooden monocoque construction, with biplane wings mounting surface raditors. These radiators, while lessening resistance and permitting great speeds were discarded as being too vulnerable to gun fire and wholly impractical for service use. The F3W-1, better known as the Wright "Apache," was the ship in which Lt. Apollo Soueck broke so many world's records for seaplane and landplane altitudes. 43,166 feet was reached as a landplane and as a single float seaplane he attained a height of over 39,000 feet.

As you can see, the history of carrier fighter aviation has progressed at a very rapid rate since that historic day in 1910 when Mr. Eugene Ely, of the Curtiss Company, made the first flight off a deck platform on the U.S.S. Birmingham at Hampton Roads, Va. Since that date many thousands of landings have been made and carrier fighting planes in particular have made a famous name for themselves. With three first class carriers in service at this time and two more to be commissioned in the future, it is hoped our Naval fighters will continue to lead the field as one of the most efficient and best equipped services in the world.

Gas Lines

(Continued from page 21)

dred active builders. Recently a contest of over one hundred model builders was held under Mr. Kowalik's supervision.

Now let us jump to the west coast. California seems to be a "hot bed of gas model-itis." Contests are being held there regularly. Irwin G. Ohlsson, who is one of the pioneer gas job builders, is one of the principal boosters of this sport in California. At the present time he is interested in developing all sorts of gadgets for gas models, including a new motor cowl and streamline wheels which he is making good use of on his models. If anyone cares to write to Mr. Ohlsson we are sure he will receive much helpful information concerning this sport. Mr. Ohlsson lives at 630 North Alavado Street, Los Angeles, Calif.

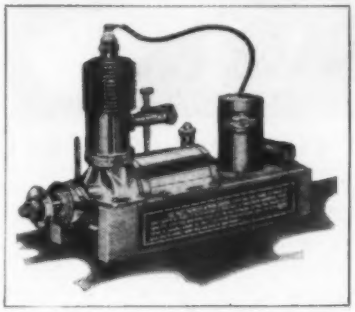
Mr. G. J. DeYoung, of Ravenna, Ohio, calls upon us for some help. He seems to be in difficulty with one of his gas jobs. He says,

"I have had some trouble with my model climbing too fast and going into a stall ending in several crashes. I set the stabilizer at zero and even balanced the model so that when holding the model by the wing tips it would point its nose a little below level, yet it still stalls."

With this meagre information it is pretty difficult to advise Mr. DeYoung. Any one of a whole list of difficulties might cause the trouble. Probably it is one of the following things: Either the wing is too far forward or the stabilizer is too negative, or a combination of both. The fact that the model balances with nose down would indicate that the stabilizer is set on too negative an angle, regardless of the fact that it is set at zero. In Mr. DeYoung's plane the line of thrust is very close with the lower longeron and there is a great difference between the center of pressure of the wing and the line of thrust. This creates a "stalling cup." In such a ship the stabilizer should be set at at least one degree positive if not more. We advise setting the wing at two and a half degrees positive and the stabilizer at one degree. If this does not work, increase the stabilizer angle to one and a half degrees positive. May we add further that this type of

BROWN JR MOTOR

MAKE YOUR MODEL PLANE A CHAMPION



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Model planes powered with Brown Junior Motors hold all major 1934 and 1935 flight records.

Motor weight 6½ ounces. Speed 1200 to 10,000 R.P.M. 1/5th H.P.

$21.50

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WRITE FOR COMPLETE DETAILS

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NOW! *Gas Model Props*

Worthy of any gas model,—accurate, balanced and made in America. Save yourself the trouble of carving propellers, and be assured of a perfect prop. Even the Champs use them. Every propeller drilled for shaft.

18" Dia. Laminated Spruce and Mahogany; varnished; for ⅛ h.p. motors ..... 1.35 each p.p.

14" Dia. Laminated Spruce and Mahogany; varnished; for 1/5 h.p. motors..... 1.35 each p.p.

16" Dia. Hickory; unvarnished; for ¼ and ½ h.p. motors..... 1.25 each p.p.

The "BUCCANEER"

America's most popular gas model. 7 ft. 4 in. wingspan. The perfect ship for every gas model builder. The model pictured above is built from our simplified plans.

Complete materials including Brown Jr. Motor, M. & M. Air Wheels, pint cans of colored dope and cement, and all parts to complete the model..... 29.50 Postpaid in U.S.A.

Complete materials without power plant $9.50

Plans only..... .50

The "CAVALIER"

The most modern gas model in the air. 9 ft. wingspan. Strong monocoque design; perfect stability, and 21 to 1 glide make it the favorite contest model in the East. Complete materials including Brown Jr. Motor, M. & M. Air Wheels, silk for covering, full quart of cement, pint cans of clear and colored dope, and all parts to complete the model. ..... 36.00 Postpaid in U.S.A.

Complete materials without power plant $16.00

Plans only..... .50

Send for the Berkeley Catalog! Dealers, write on letterhead for discounts.

BERKELEY MODEL SUPPLIES, 53 BERKELEY PLACE (Dept. U-16) Brooklyn, N.Y.

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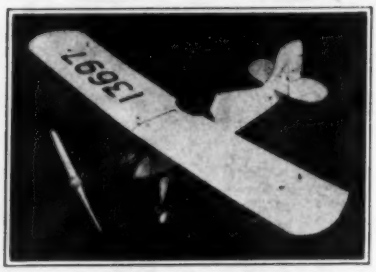
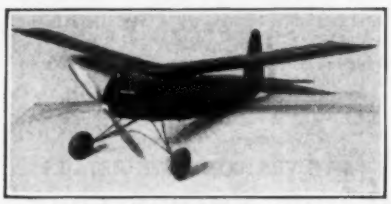


70" CORBEN GAS MODEL

21 MIN. on ½ OZ. OF GAS USING CYCLONE MOTOR

Regardless of the motor used, the **Corben** will give the maximum in gas performance. Its take off, climb, inherent stability and structural strength mark it as the leader in gas models. Thoroughly tested, 482 flights with a Brown, 99 with a Cyclone, proving its ability not only as a consistent flyer, but as a strong service model that can "take it." The construction is easy and simple, requiring no special knowledge or ability. Large full sized plans, with complete details for adjusting for flight, assure you of a successful ship. Kit contains Silk, finished prop, air wheels, etc. Price $12.75 plus 50c postage.

$4.85 NEW $7.25



THE SCOUT

Built around the new 1936 Cyclone.

With a wing span of 54" this ship has the same unusually fine flying qualities as the Corben. With a wing span of 48" the Scout has a speed of over 50 M.P.H. and an exceptionally fast climb. Weight 2 Lbs. ready to fly. Same high strength to weight ratio as the Corben. Plans show both the 48" and 54" wings. Kit complete with Silk and Air Wheels $7.25, same kit but with Bamboo paper and rubber "DoNut" wheels, $4.85. Postage on either 50c.

Corben Plans $2.50. Scout plans $1.50. Pine props, Gloss Finish, High Performance, Brown or Cyclone $1.25. Hard Wood props $1.50. 3½" Air Wheels $1.75. Silk 50c yd.

WE NOW HAVE BABY CYCLONE MOTORS IN STOCK FOR IMMEDIATE DELIVERY.

DEALERS: Liberal discount on one motor or one kit. Use letterhead. Tie up with the line that sells if you are interested in profits.

We have received letters from all over the world expressing surprise at finding a model that will actually do what the manufacturer claims. **Truthful advertising has helped make**

MODELCRAFT

2125 W. 54th St. Los Angeles

"THE LEADING MODEL SUPPLY HOUSE OF THE WEST"

FINAL OFFER—See page 1

ship in which the line of thrust is well toward the lower part of the fuselage is very cranky and unstable under certain flight conditions. When turning it will have a tendency to spiral, getting tighter and tighter. Occasionally when adjusted just right, it will fly well. In other words, this ship will fly when it performs only certain maneuvers. Other maneuvers, such as turning with nose down causes crashes. If it is possible to always keep the nose up when it is in flight, no trouble will result.

Considerable has been heard about the Baby Cyclone engine. Many members may be interested to know that this little engine is the result of over six years of experiment by W. E. "Bill" Atwood. He is well known among model builders. Atwood started his model building in 1924 at the age of fourteen and since then has received twenty-one cups in addition to many other prizes for the performance of his little ships. In 1928 Atwood won every event in the first model contest staged by the "Los Angeles Examiner." For four years he has been the California state champion. He is the first one to apply the rotary valve principle to a gas engine for model planes and he has worked it out exceedingly well in the Baby Cyclone, which is in extensive use throughout the country. Major C. C. Moseley saw the little engine and took great interest in it and through his help Mr. Atwood has been able to make great improvements and simplify the construction of the little power plane.

Here is what Frank Blier of 1375 Grand Concourse, New York City, thinks about gas model flying. He writes us and says,

"I have finished your April issue of MODEL AIRPLANE NEWS and think that the book as a whole is very good, but why not junk some of the minor articles such as indoor design and give us something substantial and useful? The subject I'm referring to concerns GAS MODELS."

Of course we don't want any of our readers to let the indoor model builders know about this; we are afraid that they might take offense. However, we see at last that indoor builders are going to receive great competition in respect to the popularity of their particular phase of this activity.

Sydney Eckstein of 2085 East 7th Street, Brooklyn, New York, says he is just a beginner, but has already built two gas jobs. We are sure that this takes him out of the novice class, especially as both of his ships fly successfully. There is one remark which he makes in his letter, however, which signifies an impression that we wish to correct. Eckstein says:

"The propeller is quite high pitched so it will keep the r.p.m. down and still give the same pull as a low pitch propeller turning over at high speeds, therefore, saving your motor for a longer life."

The pitch should never be increased in order to slow a motor down. By doing so you are bound to get into trouble and decrease the efficiency of your propeller. You get less thrust but the motor is working just as hard and if anything, will wear out sooner. If, by any chance, anyone wishes to reduce the speed of their motor and still keep the efficiency, both the area and the pitch should be increased. The important part is to increase the area, and then to increase the pitch a sufficient amount to allow for the decrease in the motor speed. In other words, the plane should fly the same speed when the motor runs more slowly. If the pitch is increased alone without increasing the area, the blades of the propeller will not act at a more efficient angle, but will slip too much. The propeller blade area should be increased in conjunction with the pitch. If you only wish to increase one, it is better to increase the blade area. In most cases this is sufficient. One of the best ways to increase the area is to increase the diameter of the propeller.

Peter Bowers of Box 357, Los Altos, California, writes that there are several boys in the vicinity near him who wish to build and fly gas jobs and they are thinking of forming a club. May we advise that this is a very wise thing to do. We ask anyone interested in this sport who lives in the neighborhood of Mr. Bowers to get in touch with him.

UNIT ACTIVITIES

Pittsburgh

Mr. Robert K. Allen of 718 Wood Street, Wilkinsburg, Pa., director of Unit No. 3, sends word that his group has grown to such an extent that he has had to appoint six assistants. They are: Mr. Garry Buyser, Mr. Harry Vogler, Jr., Mr. Ralph Kaminski, Mr. Robert L. Leitch, Mr. Thomas Cage and Mr. William B. Farrell. All of these men are prominent in model and educational activities. Mr. Allen writes:

"Mr. Farrell has promised to contact our educational headquarters in Pittsburgh and he feels very sure that he can get them to agree to form an I.G.M.A.A. Club in every high school within their jurisdiction. This, I believe, will be some boost for the organization."

This is indicative of the interest with which the I.G.M.A.A. is being received.

The Oliver High School branch of Unit No. 3 have just finished a "Buccaneer." No word has yet been received of test flights of this job. At present there are three separate groups under the heading

DOUGLAS-DESIGNED ENDURANCE MODELS

FAMED for FAIR PRICES and BETTER PERFORMANCE

SPECIAL BROWN CONTEST RUBBER INCLUDED IN ALL DOUGLAS KITS

Douglas-Designed Contest Glider has a wing span of 20". The kit contains tapered and cut to shape, wings, tail surfaces, and body, cement, glider polish, clay weight, sandpaper, full size 3 view drawing and complete detailed instructions. Complete Kit 85c P.P.

Note! Douglas-Designed kits listed contain glue, dope, tissue, rubber, shaped props, free wheeling prop, shafts, required machine work cut to shape and full size drawing. Other parts clearly printed on "AAA" balsa, strips cut to size and M & M Model Wheels, pontoon parts also printed on sheet balsa for the **"Space Conquerer."**

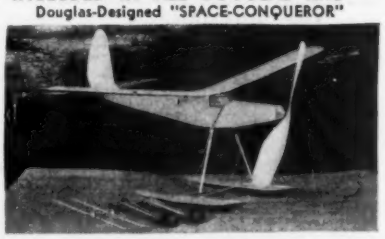
"Flying Cloud" Span 36" Length 24" Wt. 3 oz. Complete Kit with M & M Model Wheels $1.75 P.P.

"Universal Speedster" Span 30" Length 25" Wt. 2 oz. Complete Kit with M & M Model Wheels $1.50 P.P.
"Douglas Sportster" Span 32" Length 25" Wt. 2.5 oz. Complete Kit with M & M Model Wheels $1.50 P.P.

Send for 1936 Catalogue of gas model supplies and everything to build rubber powered models. Complete line of M & M Model Wheels.

Send Money Orders or CASH only. When sending cash fasten coin to letter with adhesive tape. If located in Washington add State Tax.

Douglas-Designed "SPACE-CONQUEROR"



Wing Span 36", length 27", wt. 2.8 oz. The new "Space Conqueror" Hydroplane. Landplane and Skiplane—all in one model—has an unofficial record of 19 min. 25 sec., 2500 ft. Altitude with M & M Model Wheels. Kit $1.75 P.P.

DOUGLAS MODEL AIRCRAFT CO.

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of Unit No. 3. Group A consists of the Oliver High School and has thirty-two members. Group B is sponsored by the Boys' Club of Pittsburgh. Group C is composed of members of the Stowe Township High School Model Airplane Club. The respective leaders of these groups are William Farrell, Harry Volger, Jr. and Garry Buyser. Group C is now in the midst of the construction of no less than three separate models. These groups are under the direct jurisdiction of Unit No. 3, although their activities are left entirely up to their leaders. Mr. Allen further tells us:

"We are arranging a big gas get-together for around Labor Day at Butler Airport and there will be many prizes.

"As at present there are about five complete ships in this unit, it is being arranged so that an airport may be used at certain dates for gas flights and contests. Anyone who may wish to fly and test his model will be able to do so at the allotted time under the supervision of the I.G.M.A.A. It is expected that a large plane will be available to follow gas jobs in order to prevent their loss."

Canada

Donald G. McLeod, Secretary-Treasurer of the Model Aeronautical Research Bureau of 932 Ingersoll Street, Winnipeg, Manitoba, Canada, writes and says:

"Although we have our club formed, we have not yet enough members for the I.G.M.A.A., but this will shortly be remedied.

"Since writing you last, two gas jobs have been flown. On April 10 mine was up for the first time and made a splendid flight of five minutes while we waded and crashed through two feet of slush, snow, water and ice on the airfield and surrounding country. A quarter mile glide and a perfect landing ended the flight. A week ago I again flew it and after a flight of two minutes, fifteen seconds, made another perfect landing that was a joy to see. All the pilots here are quite taken by these 'little' gas jobs.

"Boyd Moore's KG with a Forster Brothers engine has also been flown. Efforts to circle opposite torque were almost disastrous. However, it flew very well and was stable but better results were obtained by lowering the wing to the top of the fuselage after the wing mount had broken. Unfortunately, on the last flight the rubber holding the wing gave way and a power dive from about thirty feet resulted. It wrote finish to the fuselage and prop shaft, also the prop, but it will soon be going again. A new shaft was necessary in the motor.

"The KG flies about eighteen to twenty miles per hour. This I suppose will be about the same as Joe Kovel's. I understand that his was the slowest at the Nationals last year. I don't know whether it is the design of my ship or not, but I guess I have him beat. With the five pounds weight and nine square feet (approximately) of wing area, it actually flies and climbs at about twelve to fourteen miles an hour. Both my flights have worked out to about this speed. I can quite easily run along beside it and follow it around its own circle.

"Tom Smith has his Baby Cyclone and will by the end of the month be flying his Buccaneer, if we ever get the engine to run. Wilf St. John and Ed Haines are working together on a Brown powered Corben. Another builder with whom I have not been in contact has a parasol powered with a Loutrel. We have had no word about him other than that one or two other fellows hope to build gas jobs this summer.

"Without a doubt Winnipeg leads in Canadian gas model activities."

Notices

We ran across an item which may be of interest to builders. The South Bend Lathe Works of South Bend, Indiana, is giving away some booklets, the titles of which are self-explanatory. They are: "How to Cut Screw Threads in the Lathe" and "How to Grind Lathe Tool Cutter Bits." Those who are interested in machine work, especially on gas motors, may find these helpful. Write to Mr. P. A. Fergus of the company at the above address for further information.

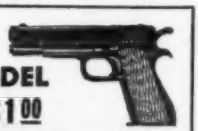
We have another interesting piece of news for members of the Association. It has been decided to give out registration cards for members' gas models. Therefore, those who wish to have their jobs registered will please write immediately for cards which will be sent them. This card should be filled in as indicated and then returned to this office. They will then receive official notification of their license numbers.

As yet we have received only a few replies concerning pins. It is planned to have a pin for the organization if a sufficient number of members desire it. Will all those who would like to have one please write to this office for further information?

Many members have been writing to us without letting us know what unit they belong to. If they belong to a unit, will they kindly indicate their unit number, if any, when they send their communications. In this way we will be able to put their information under the proper heading in the magazine.

Following is a list of the units of the International Gas Model Airplane Asso-

COLT
45 CAL. MODEL
AUTOMATIC $1.00



Half scale **Thompson Sub Machine Gun** model kit..$1.00
Full scale **Thompson Sub Machine Gun** model kit.. 3.00
Full scale Colt cal. .45 automatic pistol kit..... 1.00
Full scale Colt cal. .25 automatic pistol kit..... .50
Savage calibre 32 auto. pistol with mach. barrel .75
Luger 9 M/M auto. pistol w/ four in. mach. barrel 1.75
Same as above with six inch machined barrel... 1.90
Colt single action army revolver **FRONTIER** model with machined cylinder, rod ejector and four and three quarter inch barrel..... 1.45
Above with five and one half inch barrel..... 1.55
Above with seven and one half inch barrel..... 1.70

FREE

25 cal. Colt Automatic regular 50c kit free with every order of $2.00 or more.

These beautiful kits are complete in every detail and made of the best basswood. All parts are cut to shape and require only a short time to finish.

They are to be made for display purposes and you will be more than proud to show them to everyone. Postpaid in U.S.A. No STAMPS PLEASE. Checks 15c extra.

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"BUILT RIGHT TO FLY RIGHT"

"EAGLE" Single Cylinder, Two Cycle. Bore 1" by ¾" Stroke.
"FALCON" Twin Cylinder, Two Cycle. Bore 1" by ¾" Stroke.
"CONDOR" Four Cylinder, Two Cycle. Bore 1" by ¾" Stroke.

The design of these little engines is the result of many years experience in the aircraft field. The materials used in their construction are in accordance with the best practice used in the construction of the standard aircraft engines built by leading manufacturers of engines for the U. S. Government. The workmanship is of the best. No Die Castings Are Used In Their Construction.
We also manufacture a complete line of cold drawn streamline struts, streamline brace wires which are exact scale copies of their prototypes. We are in a position to supply efficient designs for airplanes to fly with engines and parts supplied by us. Send Twenty-five Cents For Loose Leaf Catalog—Money Refunded On First Order Over One Dollar.

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JUST WHAT YOU HAVE WANTED for Years
ILLUSTRATING MODEL PLANE IN POSITION
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"I BELIEVE YOUR MODELPLANE ASSEMBLY FIXTURE TO BE THE FINEST AID TO ACCURACY AND TIME SAVING IN MAKING MODEL AIRPLANES THAT I HAVE EVER SEEN."
TO THE MODEL MAKER WHO DESIRES POSITIVE ACCURACY THIS NEW INVENTION — PROVIDES IT.
IT IS ADJUSTABLE TO ALL SIZES UP TO AND INCLUDING THREE FOOT MODELS.
BESIDES ACCURACY and BALANCE IN PROVIDING MAXIMUM FLYING POSSIBILITIES OF YOUR MODEL —IT WILL SAVE YOU MANY HOURS OF TIME.
MODELPLANE ASSEMBLY FIXTURE with FULL ILLUSTRATED INSTRUCTIONS POSTPAID Complete—$2.25
ORDER NOW FOR PROMPT DELIVERY!
Order TODAY!
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ROCKFORD ILLINOIS

READ *the results of the National Model Airplane Meet in the Sept. issue MODEL AIRPLANE NEWS on Sale Aug. 8th.*

ciation and their directors. Those who wish to write to a member of a particular unit may write to the director of the unit at the address given below:

Unit No. 1, Turner's Gas Model Flying Circus, which is led by Mr. Allen Turner of 2025 Eastern Parkway, Brooklyn, New York; Unit No. 2, directed by Mr. E. B. Berlinrut of the Newark "Sunday Call," Newark, New Jersey. This unit is called the Northern New Jersey Gas Model Club and all members of the Association in that district should contact Mr. Berlinrut for information concerning activities. Unit No. 3 is directed by Mr. Robert K. Allen of 718 Wood Street, Wilkinsburg, Pa. Its headquarters are at the Gimbel's store in Pittsburgh. Unit No. 4, called the Newark Gas Model Chapter of the Metropolitan Model League, is directed by Mr. Nathan Polk of 263 Halsey Street, Newark, New Jersey; and Unit No. 5 is the Atlantic Gas Model Club, directed by Mr. Bill Effinger of 53 Berkeley Place, Brooklyn, New York. We now have a unit in Philadelphia, the birthplace of the present day gas model. It is directed by Mr. Jesse Bieberman of 3719 E. Brighton Avenue, Philadelphia, Pa. Mr. Irwin Polk of 421 Seventh Avenue, New York City, is director of Unit No. 7, the New York Chapter of the Metropolitan Model League. This unit has the honor of being the largest one, so far, with a membership of twenty-two. Unit No. 8 is the gas model division of the South River High School Model Aero Club. Mr. Harry Froude is supervisor of this unit.

Unit No. 9 is the San Bernardino Gas Model Club. Cecil Lesher, Jr., of 1955 E Street, San Bernardino, Calif., is the secretary. Unit No. 10 is directed by John Ginetti of 3106 Pacific Avenue, Atlantic City, New Jersey, and Unit No. 11 is led by Stephen Butcher of 1040 Genesee Street, Trenton, New Jersey.

Air Ways—Here and There

(Continued from page 28)

was taken by a photographer of the No. 3 Squadron, Royal Australian Air Force and it is through his courtesy that we are able to print it. We believe that Mr. Southwell will be pleased to hear from American model builders.

Japan

Picture No. 13 shows a model of a Kawasaki KDK-5 Japanese Fighter which Donald Moran of Shukugawa, Nishinomiya, Japan, has sent to us. Usually we receive pictures of Japanese planes from Japanese model builders. However, we are glad to know that American boys are active in model building even though they are in other countries. The model is made entirely of pine and is covered with silk. The whole ship is sprayed with gray lacquer. The model has a wingspread of three feet. Mr. Moran enjoys the distinction of being the only Air Ways Club member in Japan at the present time.

CLUB NEWS

New Jersey

The Eastern States Indoor Contest was held recently at the Naval Air Station at Lakehurst, New Jersey. Picture No. 14 shows Bruno Marchi of Boston, Mass., being congratulated by Nathan Polk, contest director, Merrill Malley of Atlantic City, N. J., and Ervin Leshner of Philadelphia, Pa., are also shown. They were winners in the R.O.G. and Cabin Events respectively.

Philadelphia

The last regular indoor senior meet of the Philadelphia Model Airplane Association was held on April 18. At this meet quite a number of good flights were made. The most outstanding was a flight of eleven minutes, thirteen seconds with Class B R.O.W. made by Walter Lees. This flight closely approached the national record for that event. Other flights of over eight minutes were made by Howard Maher, Edward Manulkin, Charles Heintz, Stanley Grokis, Robert Jacobsen, Bruno D'Angelo, Russell Gulden, Charles Markoff, William Lutz, and Charles Reuter.

As a result of the twelve junior and senior indoor meets, a total of forty-six boys qualified for the indoor Championship meet held on April 18th at the lofty Philadelphia Convention Hall. The outstanding flight of the meet was made by Hyman Oslick of the Condor chapter. Hyman flew his Class B tractor for seventeen minutes, fifty-nine seconds, which was a new local record. The winners will receive their awards at the banquet to be given in their honor at the end of the outdoor season.

By the time this appear in print three outdoor meets will have been held and the individuals and chapter champions will have been decided. These will be announced in the next issue.

Texas

Texas has not often been thought of as an extremely air-minded state. However, Jack Drew has given some information which makes us think otherwise.

Texas, long famed as a flying state, due to almost year around perfect flying weather, has thrown down the gauntlet to the most expert of model builders during 1936. While model building has been a diverting pastime with both the youngsters and their air-minded dads for the past decade, it has been only in the last few months that the thousands of air-minded Texas youths and business men have begun to organize into associations and divert their hobby of building models into channels of competitive endurance ships.

As a result, it may be safely estimated that there are over 25,000 model builders

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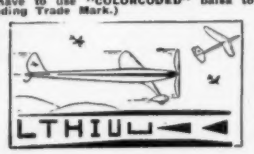

Camp and Club Directors

● The following models were designed by MODEL AERONAUTICS LABORATORY to fill the need for reliable designs; to fulfill the requirements for endurance, speed, simplicity, sturdiness and consistent flying. These objectives are made possible by superior quality of materials and countless experimental flights and design changes. JASCO weight controlled balsa and semi-finished wings enable fast and exact duplication of the laboratory model.

SPECIAL OFFER for July and August: One JASCO Beam Scale Kit given for prize with every Camp Kit.

Kit No. 1—All Balsa 19" Contest Glider: Several lost after 8 min. Complete with balsa, cement, polish, clay, plans, directions and sandpaper. CAMP KIT for 50 Gliders—$10.00 F.O.B. Single Model Kit—40 Cents P.P.
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CAMP KIT NO. 3—20 GLIDERS, 20 MODELS—$10.00, F.O.B. NEW YORK CITY.

Junior Aeronautical Supplies Co., 83-D East 10th Street, New York, N. Y.

in the state of Texas alone, with five hundred active enthusiastic builders listed in the city of Dallas.

The Texas Centennial Model Airplane Contest, which promises to be one of the outstanding model events of the season, is to be held at the Texas Centennial Central Exposition in Dallas, Texas, July 29, 1936. This contest is a special event of the gigantic $25,000,000.00 World's Fair, and is already attracting attention of model builders all over the continent.

Colonel J. G. Davis, Jr., Dallas, Texas, the director of the contest, invites correspondence with interested model builders, and will gladly furnish official entry blanks, as well as any additional information on request.

New England

One of the outstanding events of the year is the New England Championship Model Airplane Contest, which is held annually. More than 5,000 spectators and 150 contestants turned out at this event to see eleven Boston records bettered during the two days on which it was held.

Indoors, in spacious Boston Garden, exceptionally fine flying conditions prevailed, enabling the model builders who had come from all New England to compete under ideal conditions. On Saturday, June 6, these indoor categories were run off from 9 A.M. until 4 P.M.

The winners were as follows:

Stick R.O.G. Event

1) Torrey L. Cape 12:02*
2) Hewitt Phillips 10:20

Hand Launched Stick Event

1) Hewitt Phillips 14:38.4*
2) Wilbur Tyler 14:24.5

Fuselage R.O.G.

1) Daniel J. Clini 9:08*
2) Stephen J. Sardella 8:36.5

Gliders

1) Bruno Marchi ..... :42.2*
2) Hewitt Phillips ..... :33.2

Spectacular Event

1) Joe Bloom
2) Bruno Marchi

*Denotes new Boston record.

The last event was an "anything-goes" contest added at the insistence of many model builders. Competing were flying scale models and original models. The event attracted a record number of entrants and provided the spectators and contestants with many thrills. The winning flight by Joe Bloom was made with an original high-wing high-speed model which laid an effective smoke screen inside Boston Garden. In winning second place, Marchi's plane flew close to the roof-top, was shot at by an anti-aircraft gun on the floor, shed its wing, and parachuted safely to the ground while the miniature passengers parachuted down in an inflated raft. To capture third place, Arthur Sampson flew two blue scale Monocoupes attached wing-to-wing in a pin-wheel flight that drew gasps of admiration from the throng. So many oldsters turned out for this event that its continuance is assured at future League meets.

After the conclusion of the indoor battle, a banquet was tendered the winners and friends of the Jordan Marsh-Boston Traveler Junior Aviation League, sponsors of the contest, in Jordan Marsh Company's Grill Room.

The outdoor events swung into action next afternoon, Sunday, June 7, at Harvard Practice Field, in the shadow of historic Harvard Stadium, from 2 to 6 P.M. The winners of the outdoor events were as follows:

Gliders

1) Robert Shea 3:15*
2) Bruno Marchi ..... :50

Stick Type Hand Launched

1) Maurice Sulkin 3:13
2) Richard Stuart 3:00

Fuselage R.O.G.

1) Levi Walba 3:55
2) Frank Barrett, Jr. 2:32

Spectacular Event

(For "Wing Overs" Trophy)

Winner: Warren Avola with a smoke screen model flight.

*Denotes new Boston Record.

As on the previous day exceptionally fine flying conditions prevailed and the spectacular event attracted a record turnout. A novel feature of the day was the 5-meter radio circuit that was established between two home-station radio-equipped cars on the field, and two radio cruising cars on nearby streets. As models would fly from above the field, word of their flight direction would be relayed to the cruising radio cars and they would follow the models and return them to the owners.

At the outdoor events a new national tow-line record was set in the open class by Captain Willis C. Brown.

Announcement was made at the outdoor events that the summertime contests of the J.A.L. would be scheduled for July 11, August 1, and September 1 at Smith Playground, Allston. The point system will start anew with these meets.

Junior Air Races

The 1936 Scripps-Howard Junior Air Races are scheduled for Buffalo, New York, August 30, 31, September 1, 2. More than $350 in cash prizes and over a score of handsome silver trophies including the $500 Al Williams championship cup, will be distributed among the winners this year. Champion fliers from nineteen Scripps-Howard newspapers scattered from coast to coast will be sent to Buffalo aboard special planes, trains and busses, all expenses paid, to fly their tiny crafts in the third annual races. The four day program will be held at the mammoth Buffalo Airport. The contest will be sanctioned under the rules of the National Aeronautic Association.

For further information write to Mr. Ed. Clarke, National Junior Aviation Editor, Cleveland Press, Cleveland, Ohio.

Pittsburgh

Information comes from Mr. Robert K. Allen, editor of "The Dope," the weekly published by the Gimbel Model Airplane Club of Pittsburgh. One of the things which is extremely important to this club, and possibly many other record aspirants, is the fact that Dick Everett now holds the world record for Class C Stick Models with a flight of twenty-six minutes, thirty-seven seconds.

The first baggage train was being used by the Pittsburgh club for transportation to the Nationals. "Windy" Tom Fisher made the announcement that he intended to take models to the Nationals and promoted a trailer big enough for lots of boxes full of models. He assured any model builders that would entrust their valuable "brain children" to this "road pullman" that the models would reach Detroit safely. He charged a small fee to get to Detroit and return to Pittsburgh. As yet we have not heard word concerning Fisher's venture but we hope to hear the outcome in the near future. It appears, from this, that model airplane activities give wonderful trailning to future transportation executives.

CORRESPONDENTS

Here are some more boys who would enjoy communications from other readers:

Louis Chavez, 1110 East Grand Avenue, Albuquerque, New Mexico.

S. C. Fox, 726 Bush Street, San Francisco, California.

Ray Lloyd, 3384 Oakwood Avenue, Salt Lake City, Utah.

Bill McDonald, 312 East Oliver Street, Stamford, Texas.

Aviation Advisory Board

(Continued from page 30)

and lengthy. We, therefore, refer our correspondent to "Aeronautical Works" which may be obtained in the library. This book will give full information concerning this important factor.

Mr. N. C. Thomas of 2203 North 14th Avenue, Birmingham, Alabama, has been puzzled as to why the leading edge of some airfoil sections are pointed and some

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Most Popular Ever Built!

K-G GAS MODEL PLANS

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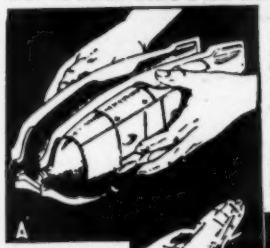

Simple as ABC

A—Fit together and cement the two moulded parts of the fuselage.

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C—The result is a perfectly shaped fuselage in the form of a hollow shell, very strong and indestructible.

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Each of the SELLEY-TEX Construction Sets contains the necessary individually designed moulded scale parts similar to those shown above.

Wing Span 20"
Length .....12¾"

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$1.25
15c Postage

Every SELLEY-TEX Kit is complete in a beautiful sturdy box with semi-finished flying or scale propeller, formed wire hooks, sealed wheels, with brass bushings, ribs printed out accurately on white sheet balsa, many special turned wood parts, finest grade of balsa wood sticks, tail wheel and fork fittings, and wire, pure para rubber, colored paper, authentic markings, colored insignia, best quality cement, colored dopes and full size easy-to-understand plan.

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Drag Dia.	Open Ring Face	Closed Face
1"	.15	.15	.15
1½"	.18	.18	.18
2"	.20	.20	.20
3"	.28	.28	.28

PURSUIT GUNS
¾" Long 3c 1" Long 4c
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SWIVEL TYPE GUNS
2" Double Action 15c
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1¼" Long 10c
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Aluminum Disc Rubber Tired Wheels
½" dia. ..... 5c ea.
⅝" dia. ..... 6c ea.
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⅞" dia. ..... 8c ea.
1" dia. ..... 9c ea.
1¼" dia. ..... 10c ea.
1¾" dia. ..... 11c ea.

Balloon Tire Alum. Disc Wheels
1½" dia. ..... 25c pr.
1¾" dia. ..... 28c pr.
2" dia. ..... 30c pr.

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1 3/16" dia. ..... 30c pr.
1½" dia. ..... 40c pr.
2" dia. ..... 50c pr.
3" dia. ..... 60c pr.
5¾" dia. ..... $1.50 pr.
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Axle Fork and Swivel Joint
⅛ up to ⅝" wheel 10c
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SEND 5c FOR CATALOG

Aluminum Disc Rubber Tired Air Wheels
1" dia. ..... 15c pr.
1¼" dia. ..... 18c pr.
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Celluloid Wheels	Balsa Wheels
½" dia.	06c pr.	.04 pr.
1" dia.	08c pr.	.05 pr.
1½" dia.	10c pr.	.07 pr.
1¾" dia.	18c pr.	.10 pr.
3" dia.	35c pr.	.35 pr.

Balloon Tired Celluloid Disc Wheel
1½" dia. ..... 30c pr.
1¾" dia. ..... 33c pr.
2" dia. ..... 35c pr.

AXLES Threaded and fitted with washers, bushings and nuts.

Lengths	⅛	¼	½
2"-3"-6"	.12	.10	.20
7"-8"-9"	.14	.12	.23
10-11-12	.18	.15	.25

Postage 3c pair; on Rubber Tired Wheels, 4c pair

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are rounded. He asks:

Question: Why is a pointed leading edge of a wing not more efficient than a round one?

Answer: In referring to the words "more efficient," we wish to ask to what period of flight or angle of attack is Mr. Thomas referring? If an airfoil is chosen which gives the greatest efficiency at low angles of attack and high speeds, it very often is inefficient at right angles of attack or when landing. Such an airfoil causes sudden spills and dives. Inasmuch as this is an important factor in modern planes it cannot be ignored.

A pointed airfoil section usually gives more efficiency at low angles of attack and high speed, but at high angles of attack it causes the airflow to break suddenly, thus creating a dangerous condition. By rounding the nose of the airfoil section, very little more resistance is incurred at low angles of attack or at high speed. Also this rounding of the nose usually produces an airfoil section whose lift does not break suddenly and which is efficient at higher angles. The effect of the rounded nose is to retard a certain amount of the air which strikes it, allowing it to flow more slowly than the air stream over the surfaces of the airfoil section. In this way it produces an air cushion all along the surfaces, which reduces burbling or any tendency for the airflow to break.

On a plane in which speed is the *supreme* factor, the pointed airfoil is best.

Question: For gas models, which is the stronger and lighter, bamboo paper or silk?

Answer: The most advisable covering is silk. Paper tears and rips easily when the plane bumps into any object. If the wing tip of a plane is struck a sudden blow, for instance, the paper on the wing will sheer, whether or not it has been touched by the object. Silk is sufficiently flexible and will stretch without tearing under these conditions. However, it will puncture, naturally, if hit directly by an object, at the point in which it makes contact with the object.

There are certain places on gas models where bamboo paper may be used because it does not come in contact with objects when making bad landings, hitting trees, etc., or because it receives little sheer in stress when the plane strikes an object. The body sides at the rear of the wing is an example of such a place.

Donald E. Wardke of 2236 Braddock Avenue, Swissvale, Pa., wants to know the following:

Question: What happened to the Northrop fighter that disappeared in Mr. Robert C. Morrison's article in the November 1935 issue of MODEL AIRPLANE NEWS?

Answer: Nothing has been heard of this plane, neither is it known whether others have been constructed of this type. However, it is well to assume that some of the new planes are a prototype of this first used.

Question: Is a high or a low aspect ratio wing of a given area more efficient for an outdoor duration model?

Answer: A high aspect ratio wing is much more efficient. The lift to drag ratio for such wings at high angles, especially when climbing, is greater by far than wings of a low aspect ratio.

Question: What percentage of the span of a high aspect ratio wing is the fuselage length to be?

Answer: This depends entirely upon the type of machine you wish to build. The length of the fuselage is determined by other factors than that of stability; for instance, the length of rubber motor you wish to put into it. The length of the motor is usually governed by the allowable overall weight of the machine or by the fact that you wish to use a small, higher speed propeller in order to get climb, rather than a large, slow speed propeller which has little climb but allows the motor to run a long time.

On most duration models with medium size propellers the distance from the wing to the stabilizer should be equal to about one-half the span. As far as stability is concerned the fuselage may be made so that the distance from the center of a high aspect ratio wing to the center of the stabilizer is four times the chord. The least limit advisable for this factor is about three times the chord.

Question: What is the pitch of a propeller and how is it found?

Answer: The answer to this has been given in part in this column, above. For a full explanation we suggest that you read the articles published under the title, "Aerodynamic Design of the Model Plane," which appeared in the issues of MODEL AIRPLANE NEWS from June 1932 to November 1932.

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Wouldn't you like one of these magnificent trips by TWA airliners, starting from the terminal nearest your home, or one of the 1000 other prizes? Remember too that everyone who sends in a correct and complete entry also receives a free copy of Megow's book, "The ABC of Model Building." Save the ends from the cartons of three different Megow models and send them with your idea. Your suggestion may be a winner.

Read the rules carefully and start now.

RULES of THE CONTEST

1. Give us your suggestion in 200 words or less—or by a complete and detailed drawn sketch—for a new Megow Model or suggest how Megow can improve the Kits now being made.

2. Do not build or send a model.

3. Each suggestion entered in the contest must be accompanied by the ends of cartons from 3 DIFFERENT Megow Kits.

4. All suggestions entered become the property of Megow Model Airplane Shop.

5. Prizes to be awarded for the best and most practical suggestions as follows:

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1000 PRIZES — Fifty-cent solid model airplane Kit made by Megow Model Airplane Shop.

Every entry will receive a copy of Megow's new book "The A.B.C. of Model Building."

6. Each entry must be accompanied by name of dealer from whom models were purchased—or by the name of a dealer in your town from whom you want to buy Megow models.

7. Judges' decisions are final.

8. All entries must be postmarked before midnight August 31, 1936. Winners will be notified by September 15th.

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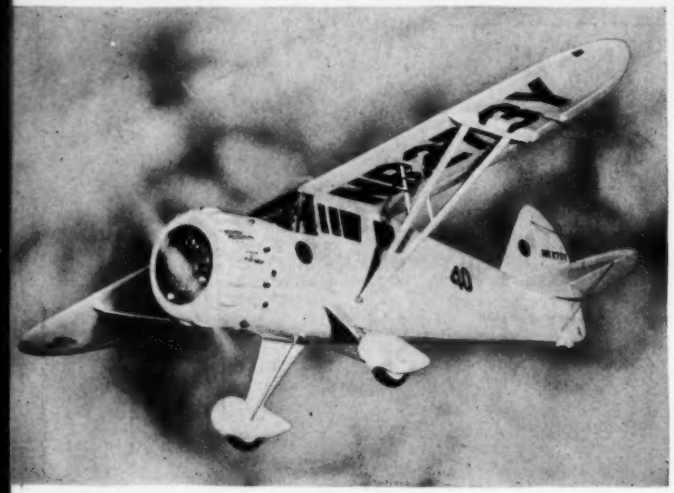

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This beautiful ship in 1929 started a new era in landplane racer design and through many requests by those who wished to head their Thompson Trophy lineup with this kit, it was thoroughly redesigned. Recommended for exhibition contests. Span 21¾", red with black scalloping, green trim. Kit SF-2..... **2.95**

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The daring stubby design that took first place in Thompson Trophy Race of 1932. Major "Jimmy" Doolittle flew the course at an average of 252 M.P.H. which is still the Thompson "high" record. Make this unusual flying model. Span 18⅝": White with red scalloping. Kit SF-27 **2.50**

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Charles "Speed" Holman won the Thompson trophy race of 1930 in this biplane. Model is of recent C-D design and employs the best type of model construction. Recommended for those who want an attractive fast flying model. Span 15⅞". Laird gold and black. Complete Kit SF-46..... **2.50**

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Jimmy Wedell's own racer. Won Thompson trophy race with it in 1933 and later the land plane speed record. In 1934, Doug Davis won the Bendix Trophy with this same ship. Model is very accurate and excites interest and favorable comment everywhere. Span 19½". Red, black and bronze. Kit SF-47..... **2.95**

Bayles' Gee-Bee Racer

This stubby little plane won the '31 Thompson trophy race. Had a very short fuselage which made it very maneuverable flying the pylons. Our model is redesigned and One most accurate model of its type on

Turner's Wedell-Williams Racer

Capt. Roscoe Turner with this ship won the '33 Bendix race and '34 Thompson race. Plane holds record for crossing the U. S. both ways. Forced out of first place in '33 Thompson race due to broken oil

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SF-17	Bayles' Gee-Bee	17 1/8	1.95
SF-18	Howard "Pete"	16	1.95
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SF-25	Curtiss A-8	32 7/8	3.25
SF-26	Heath Parasol	23 1/8	.98
SF-27	Doolittle's Gee-Bee	18 5/8	2.50
SF-28	Monocoupe Sport	24	2.50
SF-29	Boeing F4B-3 Fighter	22 1/2	2.85
SF-30	Nieuport 28 Fighter	29 3/4	2.50
SF-31	Hall Racer	19 1/2	2.75
SF-32	Boeing 95 Mail	33 1/4	2.50
SF-33	Comper Swift Sport	18	2.25
SF-34	Fokker D-8 Fighter	20 3/4	2.50
SF-35	Boeing 247 Transport	55 5/8	8.50
SF-36	Lincoln Sportplane	15	.98
SF-37	Waco C Cabinplane	24 3/4	3.25
SF-38	Buhl Bull-Pup	22 1/2	1.75
SF-39	B-J P-16 Fighter	25 1/2	1.50
SF-40	Aeronca Sport	27	2.65
SF-41	Vought Corsair V-65	26 7/8	3.75
SF-42	Howard "Ike"	15 5/8	.98
SF-43	Douglas O-38 Obs	30 1/4	2.75
SF-44	Page's Racer	23 5/8	2.65
SF-45	Martin Bomber	53 1/8	2.50
SF-46	Laird Solution Racer	15 7/8	2.50
SF-47	'33 Wedell's W. Wms	19 1/2	2.95
SF-48	'34 Turner's W. Wms	19 1/2	2.95
SF-49	Curtiss F11C-2	23 5/8	2.75
SF-50	Curtiss Export Hawk	23 5/8	2.75
SF-52	"Mister Mulligan"	23 5/8	2.95

40 Sensational ½" Models

These are precisely like the ¾" models—with a few minor exceptions. For coloring—we recommend the same colors as used on ¾" design of the same model. Remember DWARF Kits DO NOT CONTAIN ANY LIQUIDS, or STRIPING TAPE.

No.	Name	Span In.	Price
D- 1	Gr. L. Sport. Trainer	13 3/8	$ .65
D- 2	Tr. Air, Mystery Ship	14 1/2	.50
D- 3	DeHavilland-4	21 1/4	.75
D- 5	Laird Super Solution	10 5/8	.50
D- 8	Army Boeing P12-E	15	.65
D- 9	Sopwith SE-5	13 1/4	.40
D-11	A-W Quad Fighter	14	.45
D-12	Bishop's Nieuport	13 1/8	.50
D-13	Rickenbacker's Spad	13 1/2	.50
D-14	Fokker Triplane	11 3/4	.45
D-15	Fokker D-7 Fighter	14 1/8	.50
D-17	Bayle's '31 Gee-Bee	11 3/8	.50
D-18	Howard "Pete" Racer	10	.30
D-19	Supermarine S.6B	15	.45
D-20	Hawker Fury Fighter	15	.45
D-21	Hawk P6-E Fighter	15 3/4	.75
D-23	Boeing P-26 Fighter	14 1/8	.45
D-24	Lockheed Vega	20 1/2	.85
D-26	Heath Parasol Sport	15 1/2	.35
D-27	Doolittle's Gee-Bee	12 1/8	.50
D-28	Monocoupe Sportplane	16	.45
D-29	Boeing F4B-3 Fighter	15	.65
D-32	Boeing 95 Mailplane	22 1/4	.75
D-33	Comper Swift Lightpl	12	.30
D-34	Fokker D-8	13 5/8	.45
D-35	Boeing 247 Transport	36 7/8	2.50
D-36	Lincoln Sportplane	10	.25
D-37	Waco C Cabinplane	16 1/2	.75
D-40	Aeronca C-3 Sport	18	.60
D-41	Vought Corsair Fight	18	.65
D-42	Howard "Ike" Racer	10 1/8	.25
D-43	Douglas O-38 Obs	20	.65
D-45	Martin Bomber	35 3/8	2.50
D-46	Laird Solution Racer	10 5/8	.50
D-47	'32 Wedell's W. Wms	13	.50
D-48	'34 Turner's W. Wms	13	.50
D-49	Curtiss F11C-2	15 3/4	.85
D-50	Turkey Hawk	15 3/4	.85
D-51	De Havilland "Comet"	22	.85
D-52	"Mister Mulligan"	15 3/4	.50

Packing Charge Has Been Discontinued. Above Prices Are All You Pay.

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fuselage which made it very maneuverable flying the pylons. Our model is redesigned

race. Plane holds record for crossing the U. S. both ways. Forced out of first place

Write for Club Notes!